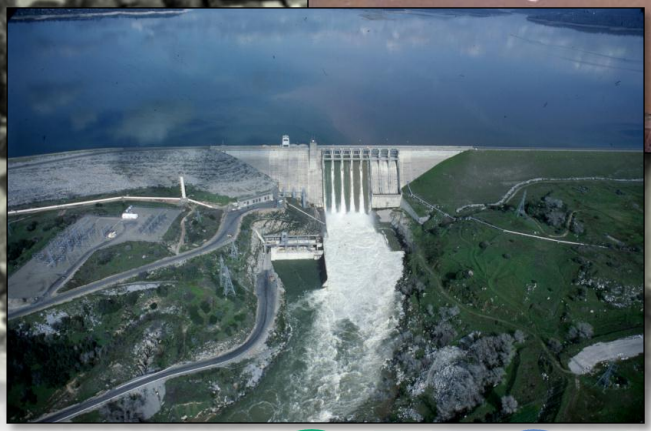
American River Watershed

Common Features
General Reevaluation Report



Appendix B
Review Documentation

October 2015

SAFCA
Sacramento Area Flood Control Agency

CENTRAL VALLEY FLOOD PROTECTION BOARD
PUBLIC SAFETY
WITH FLOOD PROTECTION
STATE OF CALIFORNIA

US Army Corps of Engineers ®
Sacramento District

Cover Photos courtesy of the Sacramento District:

Sacramento Weir during operation

Sacramento River facing south near the Pocket and Little Pocket neighborhoods

High flows on the American River at the Highway 160 overcrossing

Folsom Dam releasing high flows

AMERICAN RIVER, CALIFORNIA
COMMON FEATURES PROJECT
GENERAL REEVALUATION REPORT

Appendix B

Review Documentation

U.S. Army Corps of Engineers
Sacramento District

October 2015

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AMERICAN RIVER, CALIFORNIA
COMMON FEATURES PROJECT
GENERAL REEVALUATION REPORT

TABLE OF CONTENTS

DISTRICT QUALITY CONTROL CERTIFICATION
AMERICAN RIVER COMMON FEATURES
GENERAL REEVALUATION REPORT, SACRAMENTO COUNTY, CALIFORNIA

COMPLETION OF QUALITY CONTROL ACTIVITIES

The District has completed review of the American River Common Features General Reevaluation Study. Products reviewed include the final report, report synopsis, slide presentation, risk register, decision log and decision management plan. Certification is hereby given that all quality control activities defined in the Project Review Plan appropriate to the level of risk and complexity inherent in the product have been completed. Documentation of the quality control process is enclosed.

GENERAL FINDINGS

Compliance with clearly established principles and procedures, utilizing clearly justified and valid assumptions, has been verified. This includes assumptions, methods, procedures and materials used in analyses; the appropriateness of data used and level of data obtained; and the reasonableness of the results, including whether the product meets the sponsor's needs consistent with law and existing Corps policy. Cost data in the review copy of the document was DQC'd concurrent with ATR; however the District has yet to receive the certified final costs. Any changes resulting from the final cost certification will be reviewed prior to the Civil Works Review Board.

Based on documented policy concerns received during concurrent review, the DQC review included a consistency review between this project's document and the West Sacramento General Reevaluation Report to ensure a consistent response to ATR and policy comments, where applicable. DQC comments were provided based on this additional consistency review.

All appropriate DQC comments have been incorporated into this project.
The undersigned recommends certification of the quality control process for this product.

Jerry Fuentes
Quality Control Reviewer

Date 9/4/15

QUALITY CONTROL CERTIFICATION

As noted above, all issues and concerns resulting from technical review of the product have been resolved. The project is recommended to proceed to policy review by SPD.

Nick Applegate

9/14/15

for Mark E. Cowan
Chief, Water Resources Branch

Date

American River Common Features Draft Final Report
DQC Comments
Reviewer: Jerry Fuentes, RTS

19 August 2015

Comment	Response	Backcheck
Page 1-1, Section 1.2: Citation of Section 130 of EWDAA of 2004 is incorrect. Should be EWDAA of 2008. Also note that this need to be added to Section 2 of the PACR.	Concur. Text corrected and text added to Section 2 of PACR.	Response accepted. Comment closed.
Page 1-13, 2nd complete paragraph: Do we consider 1/3 to 1/5 ACE "high?"	Concur, term "high" removed from sentence.	Response accepted. Comment closed.
Page 1-16: This discussion is less history and more problem statement.	Concur. Wanted to emphasize points-problems as a result of the way the levee was constructed.	Response accepted. Comment closed.
Page 1-18, Added text in 2nd paragraph under Upstream Dams: Make sure this text is also added to W. Sac.	Concur	Response accepted. Comment closed.
Page 1-19, 1st paragraph: see second comment	Concur. But critical to overall storytelling.	Response accepted. Comment closed.
Page 1-23, Table 1-2: 2nd footnote: This information is repeated in text. Delete	Concur. Footnote deleted.	Response accepted. Comment closed.
Page 1-24, Section 1.5 Watershed Planning: Make sure this is consistent with W. Sac.	Concur.	Response accepted. Comment closed.
Page 1-27, Sacramento River Bank Protection Project: Update to note current GRR activities.	Concur. Language added.	Response accepted. Comment closed.
Page 1-28, CVFPP: Update with current information and note that the plan identifies a preferred alternative - SSIA.	Concur. Language added from CVFPP document.	Response accepted. Comment closed.
Page 2-5, General description: This discussion should include discussion of American River contribution as well.	Concur. Language added.	Response accepted. Comment closed.
Page 2-16, Seismic Vulnerability: Rewrite to match tone of report (sounds like cut and paste).	Concur. Paragraph rewritten.	Response accepted. Comment closed.
Page 2-36, Future Without-Project Conditions, 2nd paragraph: Don't feel comfortable with statement in final sentence. Should say that improvements would only be made as part of this project and locals are assuming authorization.	Concur. Statement removed.	Response accepted. Comment closed.
Page 2-38, next to last sentence: Suggest adding "without the LPP" to the end of the sentence.	Concur. Sentence modified to clarify that erosion protection is needed with or without the JFP.	Response accepted. Comment closed.
Page 2-39, Section 2.8.4: Are we assuming, herefore that it is in place for the without-project condition.	Concur. Sentence modified.	Response accepted. Comment closed.
Page 3-1, 1st paragraph: completeness is not a screening metric for measures.	Concur. Deleted.	Response accepted. Comment closed.
Page 3-17, Section 3.9, Table 3-3: Combined objectives should also have	Concur. Modified	Response accepted. Comment closed.

check marks for each shown.		
Page 3-20, Table 3-5: Make sure that if a measure was dropped because it did not preclude levee improvements, it would not be used in an alternative that addressed "worst second situation"	Concur.	Response accepted. Comment closed.
Page 3-25, Table 3-6: How did upstream storage and Max Plan get carried forward?	Concur. Both are not acceptable do to inclusion of the Auburn Dam.	Response accepted. Comment closed.
Page 3-26, Section 3.13.2, Why are we focused on the 1/200 ACE again?	Concur. statement is for comparison purposes only.	Response accepted. Comment closed.
Page 3-26, Section 3.13.2, second paragraph, first sentence: specify what concerns you mean.	Concur.	Response accepted. Comment closed.
Page 3-27, Section 3.13.3, first sentence: This implies that we are optimizing. These should be formulated as a common performance level. Same comment for Alternative 3.	Concur. Deleted reference to increments.	Response accepted. Comment closed.
Page 3-30, Section 3.13.5, 1st paragraph, added text: This is evaluation language, should focus only on description here.	Concur. Moved to evaluation.	Response accepted. Comment closed.
Page 3-31, Section 3.13.6: This description need a better rationale for including this plan since it does not fit into our formulation strategy.	Concur. Formulation strategy expanded to include a strategy to establish an out boundary for costs and benefits.	Response accepted. Comment closed.
Page 3-43, Table 3-16: Totals are incorrect.	Concur. Updated.	Response accepted. Comment closed.
Page 3-47, Table 3-17: Totals are incorrect.	Concur. Updated.	Response accepted. Comment closed.
Page 3-49, Table 3-18, Metrics should be renumbered.	Concur.	Response accepted. Comment closed.
Page 4-1, Chapter name: This is now that Selected Plan.	Concur.	Response accepted. Comment closed.
Page 4-1, Section 4.1, Bullet 4: Include length of new levee.	Concur. About two miles.	Response accepted. Comment closed.
Page 4-5, Launchable rock trench, Citation to figure 4-8 is not cross section graphic.	Concur. Changed to figure 4-9.	Response accepted. Comment closed.
Page 4-14, Magpie Creek Diversion Canal, 4th paragraph: No rationale provided for sizing.	Concur. Deleted.	Response accepted. Comment closed.
Page 4-14, Magpie Creek Diversion Canal, 4th paragraph: Provide additional information regarding when the takings analysis will be completed.	Concur. Coordination with RE is underway to determine schedule.	Response accepted. Comment closed.
Page 4-15, Figure 4-19: Graphic has letter designations but nothing in legend to explain them.	Concur. Will add to legend.	Response accepted. Comment closed.
Page 4-16, Section 4.1.4: Need to include length of new levee.	Concur. Added to text.	Response accepted. Comment closed.
Page 4-21, 1st paragraph: Clarify if there are any general fish and wildlife mitigation.	Concur. Clarification added.	Response accepted. Comment closed.
Page 4-26, Section 4.5.3: Are there any risk	Concur. Yes, will add to RR.	Response accepted.

register items for implementation?		Comment closed.
Page 4-40, Section 4.10: Summary does not address all significant effects beyond ESA.	Concur. Other significant effects added to summary.	Response accepted. Comment closed.
age 4-44, Item #3: Update to eliminate mention of the draft.	Concur.	Response accepted. Comment closed.
Page 4-47, Item #7: Update to eliminate mention of the draft.	Concur.	Response accepted. Comment closed.
Page 4-51, Table 4-11: Cost for levees is roughly $10 K less than W. Sac per mile.	Concur. In depth comparison is being prepared to address.	Response accepted. Comment closed.
Page 4-51, Table 4-11: Cost for bank stabilization is roughly 2x per mile in W. Sac.	Concur. In depth comparison is being prepared to address.	Response accepted. Comment closed.
Page 4-53, Table 4-12: Table is consistent with Table 4-11.	Concur. These are NED costs. Need to compare TSP costs to table 4-11.	Response accepted. Comment closed.
Page 5-5, Table 5-3: See comments on cost differences between W. Sac and yours.	Concur.	Response accepted. Comment closed.
Page 7-1, Recommendations: Costs are inconsistent with Ch. 5.	Concur. Costs have been revised and are now consistent.	Response accepted. Comment closed.
Page 7-3, Item n: Please ensure that the recommended rewrite of this item is also accomplished in W. Sac.	Concur.	Response accepted. Comment closed.

DATE: 13 August 2015

TO: Anne Baker, Environmental Manager, ARCF

FROM: Tanis Toland, Environmental DQC

SUBJECT: ARCF Draft Final EIS/EIR - DQC Backcheck

All of my DQC comments on the draft Final EIS/EIR for the American River Comment Features GRR are closed. Documentation of this review accompanies this memo.

Tanis Toland
13 August 2015

Main document changes and comments

Page 3: Comment [T1] **Tanis Toland** **8/13/2015 4:54:00 PM**

Also DWR?

RESPONSE: SAFCA is our only formal cooperating agency. DWR staff represent the CVFPB for the project, but DWR is not considered a sponsor or cooperating agency.

BACKCHECK: CLOSED

Page 1: Comment [T2] **Tanis Toland** **8/13/2015 4:54:00 PM**

Header needs to refer to the Final EIS/EIR and to the correct date. Note that, under NEPA, we clearly distinguish between the Draft and Final EIS's. Both are distinct documents and are part of the Administrative Record and both are published and widely circulated. It is important for tracking purposes throughout the project life that the distinction be clear, even where chapter or an appendix has been detached from the published final EIS.

RESPONSE: Concur. Change made throughout.

BACKCHECK: CLOSED

Page 14: Comment [T3] **Tanis Toland** **8/13/2015 4:53:00 PM**

Effects to cultural resources and resources significant to Native American tribes is identified in the Areas of Controversy and Unresolved Issues section. Is there specific information that should be included in this summary table?

RESPONSE: The table references potential adverse effects to historic properties by either of the alternatives and mitigation through implementation of agreement documents, such as the programmatic agreement. There is not specific information to include in the table beyond this since specific effects to historic properties will be later determined through execution of the programmatic agreement.

BACKCHECK: CLOSED

Page i: Comment [T4] **Tanis Toland** **8/13/2015 4:53:00 PM**

Need to identify the Environmentally Preferable Alternative in the TOC and within the body of the document.

RESPONSE: Sections ES-10 and 2.4 have been updated to identify Alternative 2 as the Environmentally Preferred Alternative.

BACKCHECK: OPEN – Correct language is "environmentally preferable alternative." See CEQ Regulations, Section 1505.2 and CEQ 40 Questions # 6a &6b. A quick fix would be to explain that, in this document, "environmentally preferred alternative" is the same as the NEPA "environmentally preferable alternative." Perhaps this choice was made to better communicate with the intended audience?

RESPONSE: Updated the sections referenced above to correct terminology.

BACKCHECK: CLOSED

Page iv: Inserted	Tanis Toland	8/13/2015 5:13:00 PM

112

Page viii: Comment [T5]	Tanis Toland	8/13/2015 4:52:00 PM

This is now the "Recommended Plan" and the NEPA "preferred alternative."

RESPONSE: TSP has been updated to Recommended Plan. Updated Sections ES - 10 and 2.4 to reflect NEPA Environmentally Preferred Alternative, CEQA Environmentally Superior Alternative, and LEDPA.

BACKCHECK: CLOSED

Page 1: Comment [T6]	Tanis Toland	8/13/2015 4:52:00 PM

If you are using the largest footprint that would reasonably be expected, wouldn't the site-specific work be expected to result in reduced impacts? If you do not reasonably anticipate additional significant impacts during PED, why flag it here? We are required to consider our project actions throughout the project life to e

RESPONSE: The intent of evaluating the largest footprint was to capture the maximum impact, however, there is the potential for a change in significance during PED. Public and IEPR comments requested that we acknowledge the possibility of supplements, which is why this language is here.

BACKCHECK: CLOSED

Page 10: Comment [T7]	Tanis Toland	8/13/2015 4:51:00 PM

Do you mean "performance"?

RESPONSE: Performance is an appropriate term to use here as well, but this is the language used in the GRR by planning/economics to discuss this issue. For consistency purposes, no change has been made.

BACKCHECK: CLOSED

Page 15: Comment [T8]	Tanis Toland	8/13/2015 4:51:00 PM

Do you mean "could"? NEPA requires discussion of all potential mitigation measures to reduce impacts but does not require that they be included in the project. It, therefore, becomes important to distinguish between those mitigation measures that could reduce impacts and those mitigation measures that are proposed to be implemented.

RESPONSE: Concur, change has been made.

BACKCHECK: CLOSED

Page 15: Comment [T9]	Tanis Toland	8/13/2015 4:50:00 PM

Do you mean "late 2015"?

RESPONSE: Concur, change has been made.

BACKCHECK: CLOSED

Page 15: Comment [T10]	Tanis Toland	8/13/2015 4:50:00 PM

Could you beef this up a bit so that it is very clear to the reader who will use this document for what purposes. The CEQA description seems pretty robust but you may wish to add some additional information to the NEPA description. Who will be making what decisions? Corps will be use the EIS as a basis for signing a ROD. The EIS and ROD, together with the GRR support a Chief's report, which is the Corps recommendation on a project.....which then goes to Congress.

RESPONSE: Section has been updated accordingly.

BACKCHECK: CLOSED

Page 56: Comment [T11]	Tanis Toland	8/13/2015 4:49:00 PM

Can you provide a clear overall significance determination for each alternative?

RESPONSE: Reviewed Chapter 3 and ensured that the determinations were there for each river/alternative/resource.

BACKCHECK: CLOSED; however, the overall significance determination for each alternative under each resource category is somewhat obscured by the by river. Table ES-3 does provide an overall description of significance for each alternative under each resource category.

Page 60: Comment [T12]	Tanis Toland	8/13/2015 4:48:00 PM

Needs content.

RESPONSE: Section updated.

BACKCHECK: CLOSED

Page 61: Comment [T13]	Tanis Toland	8/13/2015 4:48:00 PM

This seems reasonable. It is not consistent with some of the other No Action descriptions (which assume full compliance with the Veg ETL through veg free zones). You may wish to bring the others into alignment with this statement.

RESPONSE: Concur. This language has been consistently added to all No Action sections.

BACKCHECK: CLOSED

Page 62: Comment [T14]	Tanis Toland	8/13/2015 4:48:00 PM

Under NEPA, mitigation includes (in order of how each should be considered in project planning): avoiding, minimizing, rectifying, reducing and compensating.

RESPONSE: Concur. No change has been made.

BACKCHECK: OPEN. Avoidance and minimization are types of mitigation. This phrase (which is used in this title and elsewhere in the text) doesn't make sense. Do you mean "avoidance, minimization, and COMPENSATORY mitigation measures"? Two options I see for handling this: (1) add "compensatory" here and wherever this phrase occurs in the document, or (2) include an explanation in Chapter 1.8 that explains what this phrase means and the relationship to NEPA mitigation language and concepts.

RESPONSE: Changing these headings back to Mitigation Measures.

BACKCHECK: CLOSED

Page 70: Comment [T15] **Tanis Toland** **8/13/2015 4:47:00 PM**

Is the project description incomplete? How can you determine costs and impacts with an incomplete project description? Can you make some assumptions about how many miles of each measure would par t of the alternative?

RESPONSE: These two measures have been developed based on locations where each measure could potentially be implemented. In some cases, like the north bank of the American River, we evaluated impacts based on both measures being implemented – essentially doubling the impacts so that either measure's impacts are covered. However, given the level of uncertainty associated with the time frame of authorization and appropriations, vegetation is likely going to significantly change prior to project implementation, which is why this evaluation needs to occur prior to construction.

BACKCHECK: CLOSED

Page 76: Comment [T16] **Tanis Toland** **8/13/2015 4:46:00 PM**

What vegetation is planned for the bypass? How will it be managed? How will this affect water surface elevation?

RESPONSE: See the vegetation and wildlife analysis below for this discussion. The analysis here (in Land Use) is focused on the agricultural impacts to the Bypass.

BACKCHECK: CLOSED

Page 102: Comment [T17] **Tanis Toland** **8/13/2015 4:46:00 PM**

Can you be more specific? Will this be native grasses and forbs or something else?

RESPONSE: Added that the revegetation in the Sacramento Bypass would be native grasses and trees. Since this is the water quality section, the native grasses is the key issue for this resource to prevent additional erosion during flood flows. This was also previously established in the list of mitigation measures below.

BACKCHECK: CLOSED

Page 112: Comment [T18] **Tanis Toland** **8/13/2015 4:45:00 PM**

Recommend deleting this sentence. It is not necessary since any changed circumstances that occurs during the project life requires review to determine whether a new NEPA document is required or whether there is a need to reinitiate consultation under ESA, etc. If you want to address all of these kinds of possibilities you could include a paragraph at the beginning of the chapter that describes how NEPA treats uncertainty and changed conditions.

RESPONSE: Public/resource agencies/ATR/IEPR all requested that we include this statement. As a result, no change has been made.

BACKCHECK: CLOSED

Page 113: Comment [T19] **Tanis Toland** **8/13/2015 4:45:00 PM**

I am not sure how the entire Parkway would be lost. Do you mean that the Parkway would be severely damaged with high value habitat being lost for many years while natural or managed succession takes place?.

RESPONSE: See the American River Erosion Susceptibility Section of the H&H Section above. A key assumption of this project is that the American River erosion risk is significant enough that if we do nothing, it is possible to lose the berms of the parkway in a major flood event. In the case of the No Action, we assume full berm loss causing an eventual levee break. This erosion is part of the existing condition, which is why the project is necessary.

BACKCHECK: CLOSED

Page 113: Comment [T20] **Tanis Toland** **8/13/2015 4:44:00 PM**

Can't the sponsors use this approach now on both the landside and the waterside of the levees? Would the levee improvements make approval of a SWIF or a variance possible in the action alternative circumstance and unacceptable in the No Action alternative.

RESPONSE: Concur that the sponsors could apply the SWIF to both. However, under this study the Corps proposed to apply for a variance prior to the sponsor issuing a LOI to implement a SWIF. Therefore, the assumption under this project is that the variance is a Federal action by the Corps (and thus not occurring under the No Action) and the SWIF is the non-Federal Action (could occur with or without the project).

BACKCHECK: CLOSED

Page 187: Comment [T21] **Tanis Toland** **8/13/2015 4:43:00 PM**

Are there any applicable state laws or local ordinances?

RESPONSE: CEQA has been referenced below.

BACKCHECK: CLOSED

Page 200: Comment [T22] **Tanis Toland** **8/13/2015 4:25:00 PM**

Monument?

RESPONSE: Concur. Change has been made

BACKCHECK: CLOSED

Page 206: Comment [T23] **Tanis Toland** **8/13/2015 4:26:00 PM**

Southport 408 received a comment on the affect of utility relocations on cultural resources. You may wish to explicitly address this for each of the alternatives.

RESPONSE: For all activities for the project (including utility relocations) there will be inventory, eligibility determinations, and evaluation of effects to potential historic properties. This document does not have site specific information in order to complete an analysis on specific utility relocations.

BACKCHECK: CLOSED

Page 212: Comment [T24] **Tanis Toland** **8/13/2015 4:27:00 PM**

It is not clear what commitment is being made here. Are there historic properties that the project, as currently designed, would adversely affect? Is there an expectation that the project be redesigned during feasibility to avoid impacts on historic properties or is the expectation that the project would or could be redesigned during PED? If the latter, this raises concerns about whether the project has been appropriately identified, evaluated, and costs fully disclosed. Would it be appropriate to refer instead to "design refinements" during PED that may reduce or avoid impacts?

RESPONSE: There are likely historic properties that the project will adversely affect but those specific determinations by historic property have not been made. They will be made through the execution of the programmatic agreement during PED. Redesign during feasibility to avoid historic properties is not expected, but refinement of designs should be considered during PED. The costs for cultural resources were developed with consideration for significant efforts to identify and evaluate cultural resources during PED. Instead of "redesign," changed the references in this paragraph to "design refinements" in order to clarify the level of activity that may occur in PED.

BACKCHECK: CLOSED

Page 252: Inserted	**Tanis Toland**	**8/13/2015 5:13:00 PM**

Table

Page 252: Formatted	**Tanis Toland**	**8/13/2015 5:13:00 PM**

Font: Calibri, Not Bold

Page 331: Comment [T25]	**Tanis Toland**	**8/13/2015 4:42:00 PM**

Need to update.

RESPONSE: Updated.

BACKCHECK: CLOSED

Page 348: Comment [T26]	**Tanis Toland**	**8/13/2015 4:41:00 PM**

Who will request the 401 WQ Cert? When will this occur?

RESPONSE: Concur, this information has been added.

BACKCHECK: CLOSED

Page 349: Comment [T27]	**Tanis Toland**	**8/13/2015 4:41:00 PM**

Did you identify the LEDPA? Is it the preferred alternative/Recommended Plan? Include this information here.

RESPONSE: Concur. Added.

BACKCHECK: CLOSED

Page 350: Comment [T28] **Tanis Toland** **8/13/2015 4:40:00 PM**

Under ESA effect determinations are made for both listed species and designated critical habitat, using one of the following:
No effect
May affect, not likely to adversely affect
May affect, likely to adversely affect.
Please revise the text to specify the correct determination and address whether designated critical habitat is present in the project area and, if present, what your determination is.

RESPONSE: Section revised.

BACKCHECK: CLOSED

Page 350: Comment [T29] **Tanis Toland** **8/13/2015 4:40:00 PM**

Typically we would say something like, "In a letter, dated XXX, USACE requested to initiate Section 7 consultation."

RESPONSE: Concur. Change made as requested.

BACKCHECK: CLOSED

Page 350: Comment [T30] **Tanis Toland** **8/13/2015 4:39:00 PM**

Please include the USFWS' recommendations in this section together with the USACE response to each of those recommendations. This comment was also provided on the draft EIS/EIR (DQC Comment #12).

RESPONSE: Concur. The recommendations and responses have been added to this document as Section 4.7.

BACKCHECK: CLOSED

Page 350: Comment [T31] **Tanis Toland** **8/13/2015 4:39:00 PM**

EFH has not been designated for steelhead.

RESPONSE: Concur.

BACKCHECK: CLOSED

Page 350: Comment [T32] **Tanis Toland** **8/13/2015 4:38:00 PM**

NMFS' EFH recommendations should be included in the Final EIS.

RESPONSE: Concur. Will be added once received.

BACKCHECK: CLOSED

Page 351: Comment [T33] **Tanis Toland** **8/13/2015 5:05:00 PM**

Consider including EO 13112, Invasive Species.

RESPONSE: Added below.

BACKCHECK: CLOSED

Page 353: Comment [T34] **Tanis Toland** **8/13/2015 4:37:00 PM**

Are there any NRCS conservation easements on this land or on any other lands being used for this project?

RESPONSE: The draft EIS/EIR was provided to NRCS for review and no comments were received. Technical research has not resulted in any NRCS conservation easements found within the project area.

BACKCHECK: CLOSED

Page 353: Comment [T35] **Tanis Toland** **8/13/2015 4:37:00 PM**

Was For DA 1006 completed, provided to NRCS, and returned. Is this document included in the Appendix (doesn't appear to be).

RESPONSE: NRCS form DA 1006 will be included as an appendix to the final EIS/EIR.

BACKCHECK: CLOSED

Page 353: Comment [T36] **Tanis Toland** **8/13/2015 4:36:00 PM**

What is the relationship of this Act to the proposed project?

RESPONSE: The relationship is simply related to the level of protection in the study area. The NFIP is not a regulatory function over the project, just a relationship. Added the final sentence to the section.

BACKCHECK: CLOSED with the following caveat: Please check with the planner regarding this statement. USACE no longer supports the concept of "x-year level of protection." Perhaps an acception has been made in this case

BACKCHECK: Added because the GRR does identify the level of protection for the project. Specifically, Table 3-19 of the GRR indicates that Alternative 2 would bring the American River South Basin to a 1 in 147 level of protection, and the American River North Basin to a 1 in 256 level of protection. Will update this discussion to be consistent with those numbers, rather than general.'

BACKCHECK: CLOSED

Page 357: Comment [T37] **Tanis Toland** **8/13/2015 4:35:00 PM**

If you coordinated with the National Park Service, regarding this Act, recommend including this information here.

RESPONSE: Concur. Language has been added below.

BACKCHECK: CLOSED

Page 357: Comment [T38] **Tanis Toland** **8/13/2015 4:34:00 PM**

Please clarify, would the extraordinary fishery value improve over the baseline or No Action conditions or would the adverse project impacts to fisheries be reduced over time?

RESPONSE: There would be an initial direct effect during construction, but SAM results show that the long-term effects are beneficial/improvement over baseline. Section has been updated accordingly.

BACKCHECK: CLOSED

Page 362: Comment [T39] **Tanis Toland** **8/13/2015 4:34:00 PM**

Recommend specifying the number of meetings and the dates they were held.

RESPONSE: Concur. Dates and locations have been added.

BACKCHECK: CLOSED

Page 362: Comment [T40] **Tanis Toland** **8/13/2015 4:34:00 PM**

Discuss how the comments were addressed and helped to frame the scale of the analysis for the EIS.

RESPONSE: Concur, language was added following Table 55.

BACKCHECK: CLOSED

Page 363: Comment [T41] **Tanis Toland** **8/13/2015 4:33:00 PM**

Please confirm that these were DVDs and not actually CDs?

RESPONSE: They were DVDs.

BACKCHECK: CLOSED

Page 364: Comment [T42] **Tanis Toland** **8/13/2015 4:33:00 PM**

And comment cards?

RESPONSE: concur

BACKCHECK: CLOSED

Page 364: Comment [T43] **Tanis Toland** **8/13/2015 4:32:00 PM**

Can you provide some context? How many Federal, state, local agencies, NGOs, businesses, individuals provided substantive comments on the draft EIS?

RESPONSE: 137 people, to include the list above, attended the meetings. Further detail such as this will be included in the Public Response Appendix (Appendix F). This section is a brief summary and more detail will be available there.

BACKCHECK: CLOSED

Page 364: Comment [T44] **Tanis Toland** **8/13/2015 4:32:00 PM**

This is confusing. Are the comments summarized here the most significant comments? The comments raised by the greatest number of commenters? Reviewers and decision makers are most interested in being alerted to key substantive comments and how they were addressed in alternatives development and evaluation between the draft and the final EIS.

RESPONSE: Added, "The most significant comments"...focused on." Additionally indicated that the full array of comments are included in the appendix.

BACKCHECK: CLOSED

Page 364: Comment [T45] **Tanis Toland** **8/13/2015 4:32:00 PM**

Under NEPA, all interested parties are noticed regarding the availability off the FEIS and those who have submitted substantive comments on the Draft EIS must be provided with a copy of the Final EIS. This can be a CD. See 40 CFR Parts 1500-1508 (1502.19) and ER 1105-2-100, Appendix H, Amendment #1

RESPONSE: Concur. Added language indicating that the distribution would include commenters.

BACKCHECK: CLOSED

Page 364: Comment [T46] **Tanis Toland** **8/13/2015 4:31:00 PM**

Will Congress be taking one action or two separate actions? Be clear.

RESPONSE: Added "following authorization".

BACKCHECK: CLOSED with the following caveat: The modification didn't quite address my original comment. I proposed a revision within the text. "...project construciton is also contingent on congressional authorization OF THE PROJECT and SUBSEQUENT appropriat of funds TO DESIGN AND CONSTRUCT THE PROJECT.".

RESPONSE: Change accepted.

BACKCHECK: CLOSED

Page 365: Comment [T47] **Tanis Toland** **8/13/2015 4:30:00 PM**

This section needs to be beefed up so that it tells a useful story about coordination and consultation with other Federal, state and local agencies. Language included gives the impression that coordination with the state and federal agencies took place early on and leaves a question about whether coordination has continued throughout the project planning and EIS/EIR process. Need to distinguish between general coordination and required consultation.

RESPONSE: Concur, this section was updated as requested.

BACKCHECK: CLOSED

Page 365: Comment [T48] **Tanis Toland** **8/13/2015 4:30:00 PM**

Recommend that you specify, as appropriate, consultation with USFWS, NMFS and CDFW under FWCA, ESA and Magnuson-Stevens Fishery and Conservation Act. How about coordination or consultation with USEPA, RWQCB, or the air pollution control districts?

RESPONSE: Concur, updated as recommended.

BACKCHECK: CLOSED

Page 366: Comment [T49] **Tanis Toland** **8/13/2015 4:29:00 PM**

SJAFCA is identified as a Cooperating Agency. Is DWR also a Cooperating Agency?

RESPONSE: See response to cover page. No, DWR is not a coordinating agency.

BACKCHECK: CLOSED

Page 366: Comment [T50] **Tanis Toland** **8/13/2015 4:28:00 PM**

See comment T11 , above. Also, did this list also receive copies or notice of the release of the Draft EIS/EIR? If so, you may wish to make this clear.

RESPONSE: These individuals all received copies of the document. We typically send DVD copies of the document to all of the agencies and individuals listed here, and letters to residents.

BACKCHECK: CLOSED

Page 368: Comment [T51] **Tanis Toland** **8/13/2015 4:29:00 PM**

What about Sacramento Municipal Utility District?

RESPONSE: Added.

BACKCHECK: CLOSED

Page 384: Comment [T52]	Tanis Toland	8/13/2015 10:57:00 AM

Include the content providers and key reviewers from the CEQA Lead Agency and the NEPA Cooperating Agencies.

Response: Concur, added below.

BACKCHECK: CLOSED

Header and footer changes

Text Box changes

Header and footer text box changes

Footnote changes

Endnote changes

Main document changes and comments

Page 1: Comment [T1] **Tanis Toland** **8/28/2015 9:11:00 AM**

Need to write NEMDC out since this is the first time it appears in the document.

RESPONSE (VH):Concur. The change has been made as requested.

BACKCHECK (TT): CLOSED

Page 4: Comment [T2] **Tanis Toland** **8/28/2015 9:11:00 AM**

Need to define "East Side Tributaries" since this is the first time it appears in the document.

RESPONSE (VH): All areas of the East Side Tributaries have been defined.

BACKCHECK (TT): CLOSED

Page 7: Comment [T3] **Tanis Toland** **8/28/2015 9:12:00 AM**

Would the existing weir be replaced or modernized? This description seems to indicate that structure of the existing weir would not be altered by this project (Alternative 2. Is this correct?

RESPONSE (AB): Clarified the description to reflect that the extension of the Sacramento Weir would be a new structure. The existing weir is not proposed for alteration.

BACKCHECK (TT): CLOSED

Page 19: Comment [T4] **Tanis Toland** **8/28/2015 9:12:00 AM**

Comment carried in from fist DQC: How thick would the rock berm be? How thick would the silty/sandy layer be? Once this material is washed away, would it be replaced?

RESPONSE (VH): Included rock berm thickness.

BACKCHECK (TT): CLOSED

Page 20: Comment [T5]	Tanis Toland	8/28/2015 9:12:00 AM

Comment carried in from first DQC: What about the riprap, would it migrate, too?

RESPONSE (VH): Addressed possible migration.

BACKCHECK (TT): CLOSED

Page 23: Comment [T6]	Tanis Toland	8/28/2015 9:13:00 AM

Comment carried in from first DQC: What would the increase in water surface elevation be? At one time, an increase of half a foot was considered unacceptable.

RESPONSE (AB): Section has been updated to reflect that the increase in water surface elevation would be 0.10-foot during a 200-year event. Additional edits were madeto reflect that this would only be during large flood events, as the new weir would not be operated until flows from Folsom Dam exceed 115,000 cfs. The existing weir would be operated consistent with current conditions.

BACKCHECK (TT): CLOSED

Page 24: Comment [T7]	Tanis Toland	8/28/2015 9:14:00 AM

Comment carried in from first DQC: Has this been modeled? If freshwater flows leave the river and route to the Delta down the Bypass system, it would seem like this could affect salinity gradients as well as turbidity.

RESPONSE (AB): This has not been modeled, however changes could only occur during a large flood event, when there is already a huge amount of water in the system pushing salinity back down into the Delta/Bay system. The section was revised to more clearly portray the condition.

BACKCHECK (TT): CLOSED

Page 34: Comment [T8]	Tanis Toland	8/28/2015 9:14:00 AM

Mitigation must be evaluated consistent with ER 1105-2-100 (see Appendix C).

RESPONSE (AB): Updated this write up for consistency with the Biological Opinion.

BACKCHECK (TT): CLOSED

Page 37: Comment [T9]	Tanis Toland	8/28/2015 9:14:00 AM

What effect would the cutoff walls have on groundwater and other subsurface flows?

RESPONSE (VH): Concur. Included that there is minimal risk due to a non-permeable layer of soil between the groundwater table and the cutoff wall.

BACKCHECK (TT): CLOSED

Page 38: Comment [T10]	Tanis Toland	8/28/2015 9:15:00 AM

To improve clarity, please be more specific where appropriate throughout the document. In this case, the referenced vegetation s trees and shrubs?

RESPONSE (VH): Added the types of vegetation that would be permitted on site.

BACKCHECK (TT): CLOSED

Page 38: Comment [T11]	Tanis Toland	8/28/2015 9:15:00 AM

Type of vegetation?

RESPONSE (VH): Added the types of vegetation that would be permitted on site.

BACKCHECK (TT): CLOSED

Page 42: Comment [T12]	Tanis Toland	8/28/2015 9:15:00 AM

Temporarily during construction or permanently?

RESPONSE (VH): Added temporarily. Also: Once construction is complete the recreation facilities would be returned to the pre-construction conditions and long term effects would be less than significant.

BACKCHECK (TT): CLOSED

Page 44: Comment [T13]	Tanis Toland	8/28/2015 9:15:00 AM

Can you place this in context with other similar work in the Sacramento Valley/Central Valley? There are X LF/Miles of levee system. This project would place linear feet/miles linear feet of riprap. Riprap placed by other projects includes: X LF/miles of existing riprap, LF/miles of riprap currently being placed, LF/miles of riprap planned?

RESPONSE (AB): Updated to include a summary of cumulative Corps actions in the area.

BACKCHECK (TT): CLOSED

Page 44: Comment [T14]	Tanis Toland	8/28/2015 9:16:00 AM

Are these areas under an HCP or is one in development? In some cases, for example a SWIF, ESA compliance would be accomplished by the Corps under Section 7.

RESPONSE (AB): This language was from the BA and was specifically referring to non-Federal actions, as required in the ESA consultation handbook. The language has been updated to include Federal and non-Federal actions for the purposes of the 404(b)(1)

BACKCHECK (TT): CLOSED

Page 45: Comment [T15]	Tanis Toland	8/28/2015 9:16:00 AM

Do mean "placed" or "migrate"?

RESPONSE (VH):Changed to "placed".

BACKCHECK (TT): CLOSED

Page 45: Comment [T16]	Tanis Toland	8/28/2015 9:16:00 AM

Above ordinary high water?

RESPONSE (VH): Added no-in water work would occur. (AB): Also added that this measure is only implementable on the American River.

BACKCHECK (TT): CLOSED

Page 47: Comment [T17]	Tanis Toland	8/28/2015 9:17:00 AM

Need to identify the LEDPA. Which alternative is the LEDPA?

RESPONSE (VH): Concur. Identified the LEDPA. (AB): Also added explanation for why it is the LEDPA.

BACKCHECK (TT): CLOSED

Header and footer changes

Text Box changes

Header and footer text box changes

Footnote changes

Endnote changes

Comments and Responses for the
Habitat Mitigation and Monitoring Plan
American River Common Features General Reevaluation Report

*Note: all in-line changes were accepted in the document. All other comments are addressed below.

Number	Location	Comment	Response	Toland Backcheck (9/14/15)
T1	Under Primary Purpose and Goals	Recommend clarifying in this introductory section that most of the compensatory mitigation is directly tied to compliance with the ESA and is intended to off-set effects on listed species.	Concur; added text: "Mitigation for habitat loss is a requirement to compensate for the loss of habitat due to a Federal action. Section 2036(a) of the Water Resources Development Act of 2007 states that project alternatives must support recommendations with a specific plan to mitigate fish and wildlife losses. Additionally, the Endangered Species Act states that the purpose of compensatory mitigation is to offset environmental losses resulting from unavoidable impacts (40 CFR 230.93 (a)(1)."	Comment Closed
T2	On statement "The purpose of this mitigation and monitoring plan is to establish a framework for creation of mitigation sites and evaluating the success of these sites"	This MMP is proposed as a "framework for creation of mitigation sites and the success of these sites." This is inconsistent with the requirements of USACE implementing guidance for Section 2036(a) of WRDA of 2007 (31 August 2009), paragraph 1a, which specifies that: "…any report, submitted to Congress for authorization, shall not select a project alternative unless such report contains (1) a specific recommendation with a specific plan to mitigate fish and wildlife losses or (2) the Secretary determines that the	Although the draft MMP does not specifically call out the exact parameters of the survey protocols that will be established for the individual mitigation sites, it does describe the types and amounts of mitigation that would be required for habitat losses due to the project. Revised text: "This Habitat Mitigation and Monitoring Plan (HMMP) describes the types of habitats that will be impacted, the potential impacts caused by the project, and describes the types and amounts of mitigation that would be established in order to compensate for habitat losses. This plan also establishes a framework for the creation of mitigation sites and methods to evaluate the success of these sites in order to ensure that the goals and requirements of the project's required mitigation are accomplished."	Comment closed

		project will have negligible adverse impacts." At what point will a specific recommendation with a specific plan to mitigate fish and wildlife losses be completed?		
T3	On statement "Due to environmental, real estate, and hydraulic constraints within the study area, the majority of the levees would be fixed in place."	The placement of "environmental" first in this list infers that the environmental concerns are a primary driver for the fix in place option. If this is not the case, recommend reordering this list.	Concur; the text has been revised to "Due to hydraulic,, real estate, and environmental constraints within the study area, the majority of the levees would be fixed in place."	Comment closed
T4	On title "Description of Proposed Protective Measures"	Recommend using "Proposed Flood Risk Management Measures" to distinguish the content of this section from mitigation measures.	Concur; text has been revised to "Proposed Flood Risk Management Measures" as recommended. Table of Contents has been updated.	Comment closed
T5	Under Section 1.6, Potential Project Impacts, first sentence	Who would obtain the variance from whom? This is a USACE document and USACE makes veg variance decisions. Has HQUSACE agreed to grant a veg variance? Do you mean that initial engineering analyses indicate that all/part (what part) of the project would be likely to be determined during PED to be suitable for a veg variance?	The text has been revised to "A vegetation variance is being sought by the Sacramento District to comply with ETL 1110-2-583 on the waterside of the levee. The vegetation variance request requires the Corps to show that the safety, structural integrity, and functionality of the levee would be retained if the vegetation were to remain in place."	Comment closed
T6	On the heading of Table 2	I understand that these headings are being revised to increase clarity.	Added "Western Yellow-billed Cuckoo" to "Riparian" tab.	Comment closed
T7	1.7, Proposed Mitigation Measures	Need to discuss the mitigation objectives before discussing the mitigation measures that will address those objectives (see USACE implementation guidance for Section 2036(a) of WRDA 2007.	Concur. Text assed: "The preparation of mitigation plans, including objectives, plan design, determination of success criteria, and monitoring needs would be coordinated with Federal and State resource agencies to the greatest extent practicable. Mitigation objectives are specific actions to be taken to avoid and minimize adverse affects, such as Best Management Practices,	Comment closed

			compliance with Federal and State regulatory laws, and environmental commitments. Mitigation objectives include the identification of specific amounts of mitigation required to compensate for remaining unavoidable losses."	
T8	Section 1.7 on the phrase "requirements specified in the BOs."	If these are terms and conditions, state this.	Text revised to "requirements, terms and conditions specified"	Comment closed
T9	Under Section 1.7, Proposed Mitigation Measures" first bullet, on "the Corps will obtain an ETL approved vegetation variance"	See previous comment on this subject. Could you say something like: "The Corps anticipates that the project will be found suitable for a variance to the XXX ETL [need the correct number].	Concur; text revised to "A vegetation variance is being sought by the Sacramento District to comply with ETL 1110-2-583 in order to exempting the Sacramento River and East Side Tributaries from vegetation removal in the lower third of the waterside of the levee prior to final construction and design phase."	Comment closed
T10	Section 1.7 on phrase "The mitigation acreages for ARCF GRR were calculated…"	Specify the acreages of what and/ or refer to the appropriate table.	Concur; text added to describe Table 3: "Table 3 describes the types and amounts of habitat that would be potentially impacted by the project, the duration of the impacts, the amount of mitigation in total acreage according to the requirements provided by USFWS and NMFS, and projected costs as estimated according to existing mitigation prices." Additionally, information in Table 3 has been changed from mitigation ratios to total acreage required according to projected impacts.	Comment closed
T11	Under Section 1.8, Location of Mitigation and Compensation Sites, first paragraph	Can you add any specificity? For example, about how much (or what percent-sh) of the project length (ideally by waterway) would be restored to pre-construction conditions?	The only specificity we really have at this design phase is the area associated with on-site restoration. Revised text: "Sites compatible with on-site mitigation such as the 30 acres of upland GGS habitat and 82, 325 linear feet of SRA habitat would be restored in place."	Comment closed
T12	Under Section 1.8, Location of Mitigation and Compensation Sites, third paragraph	You may also wish to include similar language in the first paragraph of the document.	Concur; the language "This mitigation and monitoring plan will accompany the final EIS/EIR, and will be updated throughout the design phase as detailed design efforts allow for finalizing the mitigation plans" has been added after the phrase "This HMMP is a living document and will be modified as part of an adaptive management strategy to allow for the accomplishment of the goals and requirements in a	Comment closed

			constantly changing environment" in the second paragraph of the introduction.	
T13	Section 1.9, Compensation Timing on phrase "The authority to compensate prior to or concurrent with project construction is given under WRDA 1986 (33 United States Code [USC] § 2283)."	ER 1105-2-100, Appendix C, page C-19 provides guidance on the timing of mitigation.	Concur; language added: "Additionally, ER 1105-2-100, Appendix C states that authorized ecological resource mitigation activities and features should occur before construction of the project, concurrent with the acquisition of lands, or concurrent with the physical construction of the project."	Comment closed
T14	Section 2.0, fourth paragraph, on phrase "project objectives"	Do you mean "mitigation objectives"?	Concur; text has been changed to "mitigation objectives."	Comment closed

QUALITY CONTROL CERTIFICATE FOR CIVIL DESIGN PRODUCTS

PROJECT NAME: American River Common Features GRR

PROJECT MANAGER: Dan Tibbitts

ORGANIZATION: Civil Design Section A

TECHNICAL PRODUCTS: The edited engineering summary appendix for the Feasibility Report Milestone (FRM). This review is for edits made as a result of the concurrent review period and refinements to the plan and document.

PREPARER – I have prepared the above products in accordance with the Quality Management Plan. I have incorporated or resolved all review issues in accordance with the Quality Management Plan.

Preparer: _____ Date: 8/17/15
James Elsberry, P.E.

REVIEWERS – I have reviewed the product noted above and find it to be in accordance with the Quality Management Plan meeting project requirements, standards of the profession and Corps of Engineers policies and standards. All comments have been back-checked and closed out to my satisfaction.

QC Reviewer: _____ Date: 8/17/15
Mark Boedtker, P.E.

RESOURCE PROVIDER – I have reviewed and resolved all critical and technical issues. I agree that all project requirements and standards of the profession and Corps of Engineers policies and standards have been met.

Section Chief: _____ Date: 9.9.15
Peter Valentine, PE
Chief, Civil Design Section A

PROJECT: American River Common Features GRR
P2#: 149827
PM: Dan Tibbitts
REVIEW: Engineering Appendix for FRM

DESIGNER: James Elsberry, P.E.
REVIEWER: Mark Boedtker, P.E.
PERIOD OF REVIEW: 8/10/2015 - 8/14/2015

#	TYPE	REFERENCE	NOTES
1	Comment 08/10/2015	Table of Contents, List of Figures	There is no Figure 1 listed. Based on what was deleted prior, it appears it should be "Figure 1 - Study Area Map".
	Response 08/16/2015		Yes that is a good catch. The list of figures has been updated to include "Figure 1 - Study Area Map". Thank you.
	Backcheck 08/17/2015		Comment closed.
2	Comment 08/10/2015	Paragraph 1.3	Change Figure 1-1 to Figure 1.
	Response 08/16/2015		"Figure 1-1" reference has been changed to "Figure 1" and cross link to the figure has been incorporated. Thank you.
	Backcheck 08/17/2015		Comment closed.
3	Comment 08/10/2015	Figure 13	Delete "SEE PLANS" in the figure.
	Response 08/16/2015		Another good catch. The figure was revised with the "see plans" annotations removed. Thank you.
	Backcheck 08/17/2015		Comment closed.

WATER MANAGEMENT SECTION
CERTIFICATION FOR AGENCY TECHNICAL REVIEW

American River Common Features Project General Reevaluation Report
Placer, Sacramento, Sutter Counties, California
Synthetic Hydrology Technical Documentation, Sacramento District
September 2008, Revised January 2009

GENERAL FINDINGS

Compliance with clearly established policy, principles, and procedures, utilizing clearly justified and valid assumptions, has been verified for the subject project. This includes assumptions; methods, procedures and materials used in the analyses; the appropriateness of data used and level of data obtained; and the reasonableness of the results, including whether the product meets the customers' needs consistent with law and existing Corps criteria and policy.

I certify that an agency technical review of the project indicated above has been completed and all technical issues have been identified and resolved. I recommend certification that the quality control process has been completed.

In accordance with CESPD R 11 10-1-8, South Pacific Division Quality Management Plan, May 2000, this letter certifies that the without-project hydrology is appropriate as the basis for use in the hydraulic analysis for the American River Common Features Project General Reevaluation.

Laurine L. White — 26 Jan 2009
Laurine L. White
Hydrologist, SPK
Date

James Chieh — 1-26-2009
James Chieh
Independent Technical Reviewer
Date

John M High IV — 1-26-2009
John M. High
Chief, Water Management Section, SPK
Date

HYDROLOGY SECTION
CERTIFICATION FOR AGENCY TECHNICAL REVIEW

American River Common Features Project General Reevaluation Report
Appendix B, Dry and Arcade Creeks Flow Frequency Curves
And Synthetic 8-Flood Series Hydrographs
Upstream of Steelhead Creek, Sacramento District
November 2009, Revised January 2010

GENERAL FINDINGS

Compliance with clearly established policy, principles, and procedures, utilizing clearly justified and valid assumptions, has been verified for the subject project. This includes assumptions; methods, procedures and materials used in the analyses; the appropriateness of data used and level of data obtained; and the reasonableness of the results, including whether the product meets the customers' needs consistent with law and existing Corps criteria and policy.

I certify that an agency technical review of the project indicated above has been completed and all technical issues have been identified and resolved. I recommend certification that the quality control process has been completed.

In accordance with CESPD R 11 10-1-8, South Pacific Division Quality Management Plan, May 2000, this letter certifies that the without-project hydrology is appropriate as the basis for use in the hydraulic analysis for the American River Common Features Project General Reevaluation.

Laurine L. White — 19 January 2010
Laurine L. White
Hydrologist, SPK
Date

James Chieh — 20 January 2010
James Chieh
Independent Technical Reviewer
Date

John M. High — 19 JANUARY 2010
John M. High
Chief, Hydrology Section, SPK
Date

QUALITY CONTROL CERTIFICATE

Hydraulic Design/Analysis Section, Engineering Division

PROJECT NAME: AMERICAN RIVER COMMON FEATURES (ARCF) GENERAL RE-EVALUATION STUDY
PRODUCT: HYDRAULIC APPENDIX TO SUPPORT FINAL ARRAY OF ALTERNATIVE FOR ACRF STUDY
Actual Completion Date: 9-Sep-15

PROJECT MANAGER: DAN TIBBITTS

Background: [Include project description, technical products, and review methodology]

Additional District Quality Control was performed for the American River Common Features General Re-evaluation Study on the updated portions of the Hydraulic appendix to support the final array of alternatives for the feasibility study. The DQC Certificate from August 13, 2013 still applies as this is an update to that review, not a replacement.

The purpose of this document is to present the summary of hydraulic analyses conducted to support the American River Common Features General Re-evaluation Report (ARCF GRR) Study. This is an executive report of what has been traditionally know as a hydraulic appendix. A collection of technical memorandums (see table below) containing the detailed information typically found in a full version of the hydraulic appendix have been assembled as an office report for reference here at the District. This executive report has been prepared to meet the intention of the new Planning Modernization that USACE has undertaken.

The ARCF study area includes generally the entire Sacramento metropolitan region. The project area being considered for flood damage reduction can be divided up into three basins – Natomas, American River North, and American River South.

Both Flo2D and HECRAS models were used for this effort.

Models and Technical Memorandums Supporting the ARCF Hydraulic Appendix
Hydraulic Models
HECRAS 1-D Hydraulic Model
FLO2D 2-D Hydraulic Model
Technical Memorandums
Sacramento Basin HEC-RAS Phase I Model Development
Sacramento Basin HEC-RAS Phase II Model Development
Sutter Basin HEC-RAS Model Conversion
Datum Conversion
Downstream Boundary Conditions
Gages
Hydrologic Inputs (.dss files)
Highwater Marks
FDA Inputs
FLO-2D Floodplain Mapping Documentation
Levee Breach Sensitivity
Climate Change
Systems Risk and Uncertainty
Interior Drainage
Upstream Alternative Analysis
Calibration

HYDRAULIC LEAD

I have ensured that the above products were prepared in accordance with standard quality control practices. I have also incorporated or resolved all issues identified during District Quality Control (DQC) review.

Title: Jesse Schlunegger		9-11-2015
Print name	Signature	Date

REVIEWERS

I have reviewed the products noted above and find them to be in accordance with project requirements, standards of the profession, and USACE policies and standards.

DQC Reviewer: Peter Blodgett	Title: Regional Technical Specialist, Senior Hydraulic Engineer	
	BLODGETT.PETER.JAMES.1366852340	
Print name	Signature	Date

RESOURCE PROVIDER

I have reviewed and resolved all critical and technical issues. I agree that all project requirements, standards of the profession, and USACE policies and standards have been met.

Section Chief: Jesse Schlunegger		9-11-2015
Print name	Signature	Date

American River Watershed Common Features General Re-evaluation Report Study

SPK HYDRAULIC ANALYSIS SECTION
DISTRICT QUALITY CONTROL REVIEW

HYDRAULIC APPENDIX
DATED FEBRUARY 25, 2013
UPDATED DQC AUGUST 10, 2015

Reviewer: Peter Blodgett, P.E. SPK Hydraulic Analysis Section
Review Date: 12 August 2015
Response Date: xx August 2015
Backcheck Date: xx August 2015

The following describes SPK District Quality Control (DQC) performed for the report noted above.

Responder Comments
Blue – Comment is ready for Backcheck
Dark Blue – 2nd Response to Comment.
Red – Comment needs Discussion or more work to resolve

No.	Date	Notes
1.	Comment	Plate 4 and 5. "ARCF Study Area" should be "project area". The text in the report differentiates between study area and project area and this map is not consistent with that.
	Response	Plates were updated.
	Back-check	Comment addressed and closed.
2.	Comment	Plate 9 and 10. We should avoid the use of the term "repair" because OMRRR is a sponsor responsibility. Need clarification, are these locations of proposed improvements or existing features.
	Response	Plates were updated.
	Back-check	Comment addressed and closed.
3.	Comment	General: Recommend removing all use of recurrence interval from document. Document should use ACE.
	Response	Concur, Recurrence interval has been replaced with ACE.
	Back-check	Report still contains recurrence intervals throughout. However, this is primarily a terminology comment and does not impact the selected plan. Comment closed.
4.	Comment	Section 6.6. This section indicates the stages are based on upstream failures. Is this correct? If so, how was the upstream

		failure scenario determined?
	Response	The stages were not based on upstream failures. The text has been updated. This paragraph was trying to highlight some of the assumptions used for the study.
	Back-check	Comment addressed and closed.
5.	Comment	Figure 6-1. X and Y axis need labels. The x axis appears to be log. However, it should be probability.
	Response	Based on additional comments, this entire section has been removed including this graphic.
	Back-check	Comment addressed and closed.
6.	Comment	Section 7.2. Levee Superiority Suggest including Sanke Gap as a levee superiority reach.
	Response	This section has been rewritten, including bringing in the Sankey Gap as part of the superiority discussion.
	Back-check	Comment addressed and closed.
7.	Comment	Section 7.3. Climate Change.This wording needs to be rephrased. A project would be constructed and maintained to a design flow rate. We should not imply the design is based on maintaining a design frequency. In addition, it appears the LPP is designed to meet the ULOP requirements which are tied to a finding over the ULOP finding period. Was this climate change amount included in the design height of the LPP?
	Response	Text has been updated to reflect this concern. An added increase in height was not included in the Top of Levee Design Height. Much of the top of levee was based on 160,000 cfs coming out of the American regardless of the frequency.
	Back-check	Comment addressed and closed.
8.	Comment	Profile Plates. Text indicates profiles are based on infinite levee height in model. This assumption should probably be included on the profile plates.
	Response	The n-year profiles, Plates 12-24 are for the without project condition and do not include infinitely tall levees in the project area. Plates 31 – 56 show the existing top of levee but include the with-project Alt 1 and Alt 2 water surface profiles that have the project levees raised 20’ to account for any levee raise.
	Back-check	Comment addressed and closed.
9.	Comment	Plate 68. Index point title is wrong. This should be ARN E.
	Response	Concur. Plate Updated.
	Back-check	Comment addressed and closed.

10.	Comment	Plate 70 through 72. - All plates should not use return period. - On Plate 70. Page number is wrong. This should be Plate 70 but text says 72. On Plate 72 text says Plate 70. - The title of these plates says existing conditions but should say future without project conditions. - There term "advertised flow" is not standard terminology. Is this the "design flow" as described in the OMRRR manual? - Check location for flow comparison for yolo Bypass upsteam of Sac bypass. The arrow is shown above the sac bypass but I think this is flow below the sac bypass.
	Response	Return Period corrected to ACE, Plate numbers corrected, Title corrected. Advertised flow is from the DWR 1986 graphic which is supposed to represent the 1957 design flows that should match the O&M manual. The flow for the Yolo Bypass upstream was at RM 45 which is a half mile upstream of the Sacramento Bypass.
	Back-check	Comment addressed and closed.
11.	Comment	Erosion Protection. This section needs to more clearly describe the features that were included in the design and cost estimates.
	Response	Text has been updated .
	Back-check	Comment addressed and closed.

DISTRICT QUALITY CONTROL CERTIFICATE
for GEOTECHNICAL PRODUCTS

PROJECT AND DOCUMENT INFORMATION

Project Name: ARCF GRR

Document: Geotechnical Appendix and Office Report

Project Manager: Dan Tibbitts

Document Completion Date: January, 2013 Document Author: Michael Kynett, P.E.

Reviewer: Anthony Deus, P.E. Senior Reviewer: Mary Perlea, P.E.

The above reviewer will perform the Quality Control Review in accordance with SOP EDG-02: "Technical Product Review Policy and Procedures" developed for the Engineering Quality System. The senior reviewer will provide a review of major assumptions, analytical approaches, significant calculations, recommendations and conclusions.

REVIEW CERTIFICATION

PREPARER – I have discussed the above document and review requirements with the DQC Reviewer(s) and believe that this review is completed and that the document will meet the requirements of the project.

Preparer's Signature: _____ Date: 12 Feb 2013

REVIEWER – I have reviewed the assigned Item(s)/Section(s) noted for the above document and believe them to be in accordance with the project requirements, standards of the profession, and Corps of Engineers policies and standards.

Reviewer's Signature: _____ Date: 12 Feb 2013

SENIOR REVIEWER – I have reviewed and resolved all critical and technical issues. I agree that the item(s)/Section(s) noted for the above document are in accordance with project requirements, standards of the profession, and Corps of Engineers policies and standards.

Senior Reviewer's Signature: _____ Date: 12 Feb 2013

No.	Page No.	Comment	Response
1	xii	Is part of the Yolo Bypass included only because you have that weir structure on the Sacramento River? Otherwise why do you include Yolo Bypass?	The Yolo Bypass is included because it is a critical component to both the Sacramento Bypass Weir expansion and the I Street Diversion Structure. The study has expanded to look at features outside of the existing flood protection system that may benefit the study area.
2	Xiii	What about the windows? Do you want to discuss them here?	Windows are a component to the WRDA 96/99 project, the with project assumption is that the WRDA 96/99 project is completed. A discussion of the windows sites is a detail associated with the WRDA 96/99 project and not relevant to the ARCF GRR.
3	Xiii	No blanket?	The geology of the MCDC area is not riverine (riverbank formation) but modesto formation associated with the foothills. The subsurface conditions consist of low permeability dense/stiff silty sand and sandy silt. Essentially there are not the typical blanket/aquifer layers associated with riverine geology.
4	xv	I am not sure we want to show what has been constructed as part of NLIP. NLIP is approved for credit after the Natomas NPACR is authorized, we consider the NLIP improvements as non-existent and have them included as preferred plan in our proposal, so I would not say anything regarding the already improvements in place recently done by NLIP. However you can mention that there is additional information available from NLIP studies only.	Correct, the references to NLIP and constructed features associated with NLIP have been removed from the report text. Reference to the implementation of the NPACR as part of the without project conditions for the ARCF GRR remain.
5	xv	Delete this completely, we disregard the NLIP construction at this stage. However you may indicate the levee improvement such as cut-off wall and others was included in NPACR, and the Chiefs report approved,	See response to previous comment.

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		but do not say constructed.	
6	Xvi	Are you sure that this is for 200 year flood? The levees are designed for 200 year +3 feet of freeboard, so if 1 foot is lost than the freeboard is only 2 feet.	The seismic criteria came directly from Vlad's draft ETL on seismic analyses of levees, I can only present the criteria as it has been written in the draft ETL.
7	xvi	I would not write this, it is less stringent than the SOP which we actually apply being in the SPK	Agreed that it is less stringent, but in this section of the report I am presenting the various criteria associated with the federal levee section from the national to local level.
8	Xvii	Actually there is a typical cross section that is 1V:3H waterside, 1V:2H landside and 20 feet wide crest. Exceptions may be at ramps, pump stations and other encroachments where the levee varies from the typical cross section, but you cannot say there is no typical cross section,.	There might be some confusion here, the text does not say that there is no typical levee section of the existing levee but that there is variability in the levee section and the critical section was chosen. Further, the typical existing levee section varies for each channel.
9	Xvii	Say something regarding the Datum used (NAVD88) also regarding the horizontal datum.	Reference to datum has been included.
10	Xvii	Do you really need to show all these details on HH? These may confuse only the reviewers. What if you simply said the data was obtained from HH studies, list the years and this is all.	I believe it is warranted, the H&H changed so many times that it was confusing for us to track what version we used on what analyses and it is important to document the process and why.
11	xvii	Usually we extended the model to the centerline of the river, this is a requirements we always used, and was also imposed to the URS models for ULE. The models used bathymetric information from ULE survey	Correct, this is what we did as well. The text has been updated.
12	xviii	Did we not use wedge analyses when a thin clay layer would indicate that this would be appropriate?	No, for feasibility we used circular searches to find the critical failure surface. We acknowledge that a noncircular failure surface maybe critical in some locations but that would not have a significant

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			effect to the results and is a PED level refinement.
13	xviii	Seepage or combined berms were not analyzed at all? I believe we had some in Natomas at least.	Berms were not analyzed, berms were screened prior to analyses using maximum sections for cost and real estate analyses. The berms in Natomas were analyzed under NPACR and only levee raise was analyzed in Natomas under the ARCF GRR.
14	xix	Was this included in the acronyms?	Yes.
15	xix	Was this included in the acronyms?	Yes.
16	xx	I suggest spelling it out, you do not write the report in acronyms only.	Text revised.
17	xx	I suggest spelling it out, you do not write the report in acronyms only.	Text revised.
18	xx	Again, I am not sure we want to include NLIP improvements since the ANLIP is not yet credited and the "without project" conditions assumes NLIP not being constructed,	Text revised as per previous comment.
19	xx	What about tributaries such as Arcade Creek, NEMDC, Dry Creek?	Correct, deficiencies remain on those channels. The point I was making was that the majority of deficiencies and the most serious ones remain on the Sacramento River.
20	xx	There are no other deficiencies here? I was sure we have some seepage and slope stability issues also besides freeboard. Am also , generally, may we ask in the official report for 3 feet of freeboard or we need to talk the new language?	Yes, there are other deficiencies remaining. This sentence is just pointing out that there are overtopping deficiencies in addition to geotechnical deficiencies such as seepage, slope stability, and erosion. The text has been updated to be more clear.
21	xxi	Rephrase it, the sentence does not sound right.	Sentence does appear to convey the message of where deficiencies remain in ARN.
22	Xii	It is not clear if these were proposed and constructed already or are not constructed but there is no need for any improvement. I	This paragraph does appear to convey that I have evaluated the recommendations from previous studies as geotechnical acceptable for inclusion in

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		would rather say these were constructed not were proposed.	the ARCF GRR. Some text was revised.
23	xii	Was it not discussed to lower the weir also?	Yes, but it was screened early. This would be covered by H&H.
24	xxiii	Considerations or constrains? I believe there are constrains since it is not recommended.	The considerations were design level recommendations that would need to be implemented during further study if the alternative were recommended as the tsp. They are not constraints that eliminated the alternative as viable.
25	xiii	I suggest spelling out the first time, particularly in the Executive summary –	Text revised.
26	xiii	This entire paragraph is somehow confused. I do not understand why the additional 60,000 cfs discharged in the Yolo Bypass would increase the capacity in the Deep Water Sheep Chanel. Actually what you probable want to say is that the additional discharge in the Yolo Bypass would require additional work on the levees on both sides of the bypass by relocation, setback, raising and improvements such as seepage and slope stability mitigations to preserve the 6 feet of freeboard as required for a Bypass levee and to improve seepage and stability for a higher water elevation. The water will flow through the Bypass not through the DWSC, so practically it has no impact on the DWSC.	At this point the measures used to mitigate for hydraulic impacts associated with the alternative have not been fully defined by planning, civil, and pm. I have chosen to present the list of possible measures and the geotechnical components so that the PDT can choose which ones they need in the future without revisions to the geotech report. The paragraph referenced presents a summary of the requirements to mitigate hydraulic impacts through improvements to the affected levees in the bypass. The previous paragraph grave recommendations for the geotechnical components to increased capacity in the bypass.
27	xxv	There is no discussion on the borrow material below, it is in the main report only, but not in the executive summary.	Correct, it seemed appropriate to only discuss the needs and how we would obtain the material in the summary. Not the material requirements.
28	8	Do you have all these reports in the references?	Yes.

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29	9	Were the improvements only on American River or included some on Sacramento River also? (i.e. improvement on Sac River for the Pump Station 1.	Yes there were some Sacramento River improvements which were discussed with the other Sacramento river improvements.
30	35	Fix the table to fit on the page width (change fonts eventually) (on all tables eventually)	Table formatting revised.
31	38	Don't forget, NLIP has not been constructed , it is not without project conditions. Rephrase it.	Text revised.
32	39	This is NLIP, not yet constructed,	Text revised.
33	51	You may want to discuss that analyses were performed to determine the levee would respect the seepage and stability requirements in case of a vegetation variance will be requested during the PED	Agreed, this is discussed in a separate section of the report.
34	51	This is not clear, you may need additional description. Anyway, I did not understand what you mean.	Text revised.
35	51	A planting berm cannot serve as access road for vehicular access!	Text revised.
36	51	Are the following paragraphs mitigation measures? I don't think so, these are analyzed alternatives. In this paragraph 8 you have mitigation measures only. You may have eventually a separate paragraph regarding studied alternatives.	As presented these are measures. The Sacramento Weir and Bypass widening is a measure to address overtopping of the Sacramento River and on its own is not an alternative. The I Street Diversion Structure is a measure to address seepage, stability, and erosion on the Sacramento River.
37	51	See the comment above. These are not mitigation measures but alternatives.	See previous response.
38	58	Did you not use an anisotropy 1 for poorly graded sands?	No, all the material parameter guidance at the beginning of our analyses provided a range between 4 and 10 for sands. Since then the ULE

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			study has recommended 1 for clean sands. We could not revise our parameters at that late date and maintain schedule. I have performed a sensitivity study of this and the difference is relatively small. The Kh is vastly more important than Kv for sands.
39	65	Check the numbers. This is after 11.4.5.	Text revised.
40	66	This segment does not meet criteria. You do not have with project analyses results	I believe the wrong results were presented here, the figure has been updated.
41	66	Stability does not meet criteria. You do not have any mitigation measure and with project analyses results?	I believe the wrong results were presented here, the figure has been updated.
42	68	You may indicate this is a new levee designed and constructed to meet recent requirements	I would prefer not to state that. The report presents the construction history of the segment in a previous section. It may not be totally accurate to say that it was designed and constructed to modern guidance as it probably wouldn't meet SOP-003 requirements of the requirements of a 408 review conducted today.
43	68	No with project for stability analysis?	No, the levee meets seepage and stability criteria for top of levee and design water surface elevations.
44	72	It looks like with project barely meets criteria. I suggest to add a table showing the gradients and FS with and without project as a summary.	Correct, this is discussed in text. I would prefer not to add a table.
45	85	May you please check the sentence, it does not sound right	That should have been a report reference, the text has been revised.
46	89	You need to discuss the white paper accepted by the HQ and explain the reasons for non-compliance: the fact that we do not do any work on the landside slope and levee so we do not cut trees there. You cannot	Correct, the text was revised. However, the white paper never went anywhere, I referenced meetings held with HQ that were documented with meeting minutes instead.

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		just say not compliant with no explanation why.	
47	89	Actually the construction on the Sac River is from the landside toe to the river but not on the landside entire 15 feet from the toe. I suggest to indicate a 10 foot wide access road will be constructed along the landside toe , the remaining 5 feet for vegetation free zone will be the responsibility of the Sponsor. Leave it there, do not say when and how. Show it also like that on the drawing. Also trace a horizontal line from the landside toe to show the corresponding toe of the levee on the waterside slope, to show that trees are above the toe	As per our conversation, the 15 feet vegetation free zone would be acquired for the project. The exact details of how the vfz versus the access road were not important for geotech. We decided to simply state for the VVR that a 15 foot vegetation free zone would be acquired as part of the project.
48	92	We need to discuss the stability, I am not sure I agree with it. You need to remove a piece of the levee supposed to be gone due to the tree fall and have a steeper slope, than do a stability analysis for rapid drawdown and one for intermediate river level. I do not really agree or understand what you did so far. Seepage analysis and slope stability of the landside slope is not needed since you have a cut-off wall.	It appears that figure 14-3 was obscured for some reason in the document. As shown in that figure and described in text, the analyses did remove the tree fall scour as described in your comment. Landside seepage and stability was performed to confirm that the tree fall scour did not adversely affect the performance of the seepage and stability improvements.
49	92	I think you need a paragraph regarding the O&M corridor for inspection and maintenance, also show the sketch from Sarah. You can relate these two together if you want but need to discuss it for all areas, including American River.	The O&M corridor will be covered in the planning report as per our meeting with April and Virginia. The O&M corridor is not a geotechnical component and is unrelated to the ability to obtain a vegetation variance.
50	93	NLIP is not yet considered as without project conditions.	Text revised.

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51	93	Say something on the O&M corridor	See previous comment.
52	94	Check numbering	Text revised.
53	96	Is it geotextile or Tensar for reinforcement? Need to specify.	Andy Johnson has design/construction experience in New Orleans with geotextile reinforcement and performed this analysis for us. Geotextile was his preference.
54	96	Fig. 15-4 shows a levee with a cut-off wall, I do not see the cross section with the geoptextile or tensar. May you check again please? Also this figure needs wore work. What is the benching width below the dashed line. We need to discuss it a little.	Correct, the wrong figure was included. An updated figure has been included.
55	99	Use SB for traditional open trench method	I am not recommending one over the other, that is PED. WRDA 96/99 used SCB, it is possible we would again.
56	100	The minimum 1:2 slope is not only for stability but for O&M also (walkable, wowing). You need to indicate a special ground cover is recommended that will not require mowing, if the slope is steeper than 1:2/	That is an O&M/Planning issue. Geotechnical, the geotextile allows for maintaining the existing footprint and slope.
57	100	Do you really need to relocate or replace the open ditch with culverts if you have a cut-off wall?	Yes.
58	101	I do not recall any floodwall for levee raise. You need to show a cross section with the adjacent levee that will be raised to 200 year level of protection also.	Raises were not included in the NPACR, the ARCF GRR did a comparison between an embankment raise and a floodwall raise.
59	103	This is also an improvement in place, so is a continuation of the Par. 15.	The Magpie Creek area does include levees but also several other features. The previous section included solely recommendations for levees within the existing flood control system. The Magpie Creek levees and additional features are

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			not part of the existing system and therefore have been included in a separate section.
60	105	Consider this as Alternatives for increasing the level of protection but not for levee improvements. Suggest to consider it as a separate paragraph.	Again, this is a separate measure associated with levees outside the existing system and is therefore a separate section.
61	106	Should be Part 17	Again, this is a separate measure associated with levees outside the existing system and is therefore a separate section.
62	111	Was this coordinated with Vlad? Why is it different than the entire CF GRR study? It has to be the same seismicity, it is within the basin anyway. Who made this paragraph?	The seismic characterization was done in accordance with Vlad's guidance. The analyses is not different that the entire ARCF GRR study performed by George Hu. The diversion structure was deemed by be a significant structure with critical seismic design considerations and therefore a location specific seismic characterization was performed.
63	124	Indicate there is no improvement for this reach, therefore the same curve is with and without project conditions	Text revised.
64	125	Where is the curve for with project conditions? Do you have any improvement here? It looks like it needs improvement for seepage	No with project analyses was performed. First, this section was not utilized for economic analyses. Secondly, the deterministic analyses met criteria. The BTA was very sensitive to the input parameters and slightly more conservative than the FEM analyses. Instead a judgment call was made to recommend cutoff wall extents and depth based on coordination with DWR/AMEC on the ULE results using information that was not available to us at the time of analyses.
65	127	Why is this the same curve as with project condition? It does not look there is a need for an improvement. You indicate that a cut-off wall is recommended, this means	I believe the wrong results were presented here, the figure has been updated.

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		seepage may be an issue.	
66	129	You need somehow to explain why you do not have any improvements for stability particularly that the Prf is above 15% (which requires mitigations. Actually you may indicate that the high Prf is for water at the crest of the levee, for 3 feet below (design level) it is 0.	Agreed, text revised.
67	133	No erosion protection on this reach? If so, add a reduced curve	Apparently there is, the curve has been revised.
68	136	What do you want to say here?	Text revised.
69	139	Check the two sets. The stability without project condition is flat 0 and with project condition you have a risk up to 10%	I believe the wrong results were presented here, the figure has been updated.
70	139	You need to explain the R&U analysis for the Natomas existing conditions was provided in the NPACR. What you have here is strictly the R&U considering the approved NPACR, only for the additional levee raise. Otherwise it is not clear	Text was already included that described this.
71	139	What about reaches A and B	The report was updated with all the Natomas Curves
72	139	Check the pages, it shows Page 137 of 134?	Formatting changed.
73	149	I am not sure we include anymore the list of approved quarries in the specifications, so I believe you do not have to add it in the report either. Actually you do not add this list in the geotechnical report for the design phase either.	True, for consistency I prefer to keep it in. We provided soil borrow locations so rock locations seem appropriate.
74		Consider the NLIP project not being constructed, not part of the “without	Agreed, comment incorporated.

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		project" conditions, but consider NPACR approved for improvements to the exiting level of protection. I tried to chase down all references to the already constructed NLIP but I may miss some of them.	
75		I would recommend calling the probabilistic analyses Risk Base Analysis. It is strange you have it at the end, however it is explicable because you have included the with project curves. Normally it should be following the deterministic analysis, this actually was the reason for improvements.	While the existing/rescinded USACE guidance (EM/ETL) do reference the analyses as "Risk Based" the comments I have received in past ATR reviews have been technically correct that it is not risk based. The geotechnical analyses we perform is technically correct as probabilistic analyses that is used in hazard analyses. Risk analyses is technically not performed.
76		R&U curves: I recommend reducing the horizontal scale for each segment within the top to toe levee height to make the figures more readable.	I understand the figures are a little hard to read but, the R&U spreadsheet I developed has code that auto creates the x and y axis based on a standard scale for all points regardless of the levee height. That way all of the slopes of the lines in the graphs are equal representations. Reformatting would be significant effort and would no longer provide a standard scale for relative comparison between index points.
77		You should discuss the LSAC rating also as part of the Risk Based Analysis. The HQ is interested to have the rating done before the feasibility report. Showing that you have it done and it is already categorized by LSOG it will help the HQ for a better understanding and for an approval with fewer comments. The geotechnical engineering of this report was actually included in the LSAC. You may just summarize it and indicate the rating for each system. Tony may help you a lot, he did a great job for the LSAC.	Agree, comment incorporated. A section has been added at the end of the R&U section.

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78		Include a paragraph on access road along the levee on the landside, it is completely missing. Add as an enclosure the memo we sent to the HQ asking for the American River landside slope, vegetation issue and ROW and discuss why we don't touch American River landside vegetation and access.	This is a planning consideration, not a geotechnical one.
79		Separate the geotechnical fix in place levee improvement as an analyzed alternative (with subchapter for each basin) and the other 2 (widening the Sac Bypass and diversion structure) present them as separate alternatives not as geotechnical mitigation.	HQ has not given approval of the final array of alternatives. Therefore the alternative descriptions may change. I have chosen to describe alternatives and their geotechnical components so that planning can arrange them as necessary and in accordance with my technical recommendations. The widened Sacramento Weir and Bypass are not geotechnical mitigation, they are hydraulic improvements for increased system performance. I provided the geotechnical measures associated with this feature. The Diversion structure is a measure that addresses seepage, stability, erosion, and overtopping and requires its own set of geotechnical recommendations not associated with the existing flood control system.

QUALITY CONTROL CERTIFICATE FOR COST ENGINEERING PRODUCTS

Project Name: AMERICAN RIVER COMMON FEATURES - GRR
Project Manager: Dan Tibbitts

Technical Products: GRR documents
Actual Completion Date: 9/9/2015

PREPARER – I have prepared the above the products in accordance with Quality Management Plan.

Preparer: date:

REVIEWERS – I have reviewed the product noted above and find it to be in accordance with the Quality Management Plan meeting project requirements, standards of the profession and Corps of Engineers policies and standards.

Lead QC Reviewer: date:

Preparer – I have incorporated or resolved all review issues in accordance with the Quality Management Plan.

Preparer: date:

Resource Providers – I have reviewed and resolved all critical and technical issues. I agree that all project requirements and standards of the profession and Corps of Engineers policies and standards have been met.

Section Chief: date:

Branch Chief: date:

ARCF-GRR

Feasibility Study

EXTERNAL REVIEW

Document Under Review: ARCF-GRR MII Feasibility Cost Estimate

Backcheck Document:

ATTN:

	ADMIN USE ONLY	REVIEWER				RESPONDENT								
	COMMENT ID (DO NOT Edit this Column)	REVIEWER CONTACT INFO	LOCATION IN REPORT/DWG	DATE OF ORIGINAL REVIEW COMMENT MM/DD/YY	ORIGINAL REVIEW COMMENT	RESPONDENT CONTACT INFO	DATE OF RESPONSE MM/DD/YY	RESPONSE	CONCUR	NON-CONCUR	FIO	CARRY FORWARD	CLOSED Y / N	DATE OF BACK CHECK MM/DD/YY
	Date of Document under review and Sub info if appropriate (e.g., "BCI - Dated June 8, 2012")													
1	1	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	Project Properties	5/21/2015	"General" tab - add phone number to contact information and possibly email address	Robert Vrchoticky (916) 557-7336, Robert.D.Vrchoticky@usace.army.mil	5/29/2015	Not enough characters can be input into the 'General' tab so notes have been added to the general 'Notes' tab, authored as POCs.	X				Y	6/19/2015
2	2	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	Project Properties	5/21/2015	"Labor" tab - Please add more specific info on the rates used. DB rates indicate when they were updated.		5/29/2015	Added additional wording to Note - 'Labor Rates are per General Decision Number - CA140009 12/19/2014 CA9 State - California Construction Types - Building, Heavy (Heavy and Dredging), Highway Counties - Multiple (including Sacramento County) '	X			X	Y	6/19/2015
3	3	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	Project Properties	5/21/2015	"Equipment" tab - current costbook being used. Prior to final ATR'd estimate, consider updating to most current fuel rates. Currently they look just a little high, however fuel is ver cycical and may be fine over the long run.		6/12/2015	Fuel Costs updated.	X				Y	6/19/2015
4	4	Joe Reynolds, (916) 557-7573,	Project Properties	5/21/2015	"Notes" tab - Scope is included.		5/29/2015	FIO			X		Y	6/19/2015
5	5	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	Contractors Tab	5/21/2015	All bonds are below 1%. Consider making at least 1%.		5/29/2015	Bond Table 'Class B' typically appear to be low per DQC reviewer's previous conversation with Bid Agent (1-1.2% is more typical). Increased to 1.2%.	X				Y	6/19/2015
6	6	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	Contractors Tab	5/21/2015	Profits generally 8.5% with a few at 10%. Consider getting Profits all up into the 10% range.		5/29/2015	Weights in Profit Weighted Guidelines increased to reflect profit around of just over 10%. Assumed relatively high values due to project size, complexity (confined area, utility crossings), construction duration (10 yr plus), and risk (e.g. unknown utilities).	X				Y	6/19/2015
7	7	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	Project Items Tab	5/22/2015	Zero Quantity Check: You may want to put a note describing the use of "NULL ITEM" - ARS-Reach G/ Levees / Jet Grouting / Random Fill => Zero quantity, please verify this to be the case for this item.		5/29/2015	NULL ITEM' was previously used as a 'dummy' in order to express task duration only (not cost). In this case all those items were part of omitted folders. Deleting the omitte folder removed all 'NULL ITEMs' Quantity in Reach G corrected.	X				Y	6/19/2015
8	8	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach A	5/22/2015	Appears that time at CHP scales along HWY 80 have not been accounted for in haul cycle times. There are scales on both East bound and West bound directions. Any time Teichert-Cool Cave is used as a supplier, this will be the case.		5/29/2015	Added 7 minutes as average wait time at the scales for all trips to-from Teichert Cool Cave.	X				Y	6/19/2015
9	9	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach A	5/22/2015	Several staging areas appear that they will requuire removal of existing elements to be able to gain access to them. Along with this, estimate is also missing the repair of staging areas. Highlighted areas on GE indicate that there are areas that will require repair of gates, fences, grass areas.		6/4/2015	Estblishment and repair of staging area is considered to be part of JOOH costs. Locations identified on Google Earth are not per any design (were a rough guess by the Cost Engineer. Civil Designers have only indicated that about 1 acr per levee mile was needed for staging.		X			Y	6/19/2015
10	10	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach A	5/22/2015	In this reach there are numerous asphalt ramps that are between the top and top of levee that may need to be repaired at completion of project.		5/29/2015	Added costs for resurfacing ramps that appear from Google Earth to be asphalt. Also added costs for regrading, compaction, adding AB to AB ramps.	X				Y	6/19/2015
11	11	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach A	5/22/2015	haul assumptions indicate to midpoint of reach, but do not address how the trucks would make there way onto the levee in one location and off the levee in another. What is missing is the time lost in the various subreaches.		6/4/2015	Checked sensitivity. Determined Haul Routes to Access Pts of subreaches for several reaches. Using the average (not rounded down to the nearest 5 MPH) in the calculations. This resulted in an average increase of 0.14% in the construction costs. This is not considered significant.		X			Y	6/19/2015

12	12	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach A	5/22/2015	Project will require bicycle/pedestrian detours. Estimate does not address this hidden cost.		6/4/2015	No design has been done for this at this stage. Establishment of bicycle/pedestrian detours. Added a percentage cost of 0.5% to cover temporary access ramps, bicycle/pedestrian detours, etc. Folder added under Relocations.	X				Y	6/19/2015
13	13	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach B	5/22/2015	See comments 8, 9, 10, 11, 12		6/4/2015	(8) Added 7 minutes as average wait time at the scales for all trips to-from Teichert Cool Cave. (9) Estblishment and repair of staging area is considered to be part of JOOH costs. Locations identified on Google Earth are not per any design (were a rough guess by the Cost Engineer. Civil Designers have only indicated that about 1 acr per levee mile was needed for staging. (10) No ramps that appear to be available from Google Earth appear to be asphalt. Restablishing any gravel ramps should be a minimal cost and is considered at this time to be covered under mob/demob costs. (11) Checked sensitivity. Determined Haul Routes to Access Pts of subreaches for several reaches. Using the average (not rounded down to the nearest 5 MPH) in the calculations. This resulted in an average increase of 0.14% in the construction costs. This is not considered significant. (12) No design has been done for this at this stage. Establishment of bicycle/pedestrian detours. Added a percentage cost of 0.5% to cover temporary access ramps, bicycle/pedestrian detours, etc. Folder added under Relocations.					Y	6/19/2015
14	14	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach C	5/22/2015	See comments 8, 9, 10, 11, 12		6/4/2015	(8) Added 7 minutes as average wait time at the scales for all trips to-from Teichert Cool Cave. (9) Estblishment and repair of staging area is considered to be part of JOOH costs. Locations identified on Google Earth are not per any design (were a rough guess by the Cost Engineer. Civil Designers have only indicated that about 1 acr per levee mile was needed for staging. (10) Added costs for resurfacing ramps that appear from Google Earth to be asphalt. (11) Checked sensitivity. Determined Haul Routes to Access Pts of subreaches for several reaches. Using the average (not rounded down to the nearest 5 MPH) in the calculations. This resulted in an average increase of 0.14% in the construction costs. This is not considered significant. (12) No design has been done for this at this stage. Establishment of bicycle/pedestrian detours. Added a percentage cost of 0.5% to cover temporary access ramps, bicycle/pedestrian detours, etc. Folder added under Relocations.					Y	6/19/2015
15	15	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach D (alt 1)	5/22/2015	See comments 8, 9, 10, 11, 12		6/4/2015	(8) Added 7 minutes as average wait time at the scales for all trips to-from Teichert Cool Cave. (9) Estblishment and repair of staging area is considered to be part of JOOH costs. Locations identified on Google Earth are not per any design (were a rough guess by the Cost Engineer. Civil Designers have only indicated that about 1 acr per levee mile was needed for staging. (10) Added costs for resurfacing ramps that appear from Google Earth to be asphalt. (11) Checked sensitivity. Determined Haul Routes to Access Pts of subreaches for several reaches. Using the average (not rounded down to the nearest 5 MPH) in the calculations. This resulted in an average increase of 0.14% in the construction costs. This is not considered significant. (12) No design has been done for this at this stage. Establishment of bicycle/pedestrian detours. Added a percentage cost of 0.5% to cover temporary access ramps, bicycle/pedestrian detours, etc. Folder added under Relocations.					Y	6/19/2015

16	16	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach D (alt 1)	5/22/2015	You may have to get creative on the access. On the south end, you may need to move K-rail out of the way and restore at the end of every day.		6/4/2015	At the access point cited (existing K-rail along the road, 20 ft sections), there is an area over 100 ft6 wide where bicycles access the levee. There are about 4 small (6"-12" dia) existing trees that either must be removed, or k-rail removed and re-set each day. There are also two sidewalk access paths. Assumption is that the trees will be removed and replanted and sidewalk will be removed and replaced.	X				Y	6/19/2015
17	17	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach D (alt 1)	5/22/2015	GE layer indicates that there are no seepage issues, but MII indicates installation of DSM, Excavator, and Jet grout in estimate. Also indicates degrade. Please verify quantities, and if needed and remove all related un-needed tasks. Looks as though nothing needed in Old Sac but possibly further south these tasks may be needed.		6/4/2015	Per the quantity takeoff provided by Civil Design, about cutoff wall is required south of about STA 125+00 (intersection of Front Street and Miller Park Circle) Jet grouting is required around two large RC Boxes. Note the shaded area from Google Earth relative to Seepage extends to about STA 96+00, but this is not correct. Civil has not provided an updated kmz file, QTO value and station is used. Quantities for cutoff walls and jet grouting remain unchanged.		X			Y	6/19/2015
18	18	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach D (alt 1)	5/22/2015	Bank stabilization is estiamated using water side placement. Consider using waterside placement for sand filter as well.		6/4/2015	The quarry that the stone protection is expected to come from for waterside placement is not a supplier of bedding sand for the riprap. Sand would have to be hauled from the source to someplace along the river where it would be loaded on barge and then transported via barge for placement at the various slope/erosion protection sites.		X			Y	6/19/2015
19	19	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.a	MII - ARS - Reach D (alt 1)	5/22/2015	This reach indicates slurry wall needed and stationing indicated along top of levee where there is a rail line present. Estimate does not indicate R&R of RR Track.		6/3/2015	RR Track R & R added.	X				Y	6/19/2015
20	20	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach D (alt 1)	5/22/2015	CL stationing appears to go into parking lot of hotel. There does not appear to be any tasks associated with removing & replacing asphalt, and any associated concrete repair.		6/4/2015	This appears to be in ARS E (~STA 239+00 to 247+00). This is not an area of Cutoff Wall placement, but WILL be part of the haul route. Haul Route surface repairs are included under Relocations.		X			Y	6/19/2015
21	21	Joe Reynolds, (916) 557-7573,	MII - ARS - Reach D (alt 1)	5/22/2015	Due to bike trail basically being the haul route, consider adding task to repair bike trail		6/4/2015	Similar to Cmt 12. Levee Access Asphalt Repairs have been added as part of relocations.	X				Y	6/19/2015
22	22	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach D (alt 1)	5/22/2015	Does haul route include getting on levee at one point and getting off at another?		6/4/2015	Similar to Cmt 11. Haul Routes were typically determined using the average distance from the upstream/downstream access points and the midpoint of the reach. Checked sensitivity of this using apparent access points for reaches ARSA,B,C,D. Determined Haul Routes to Access Pts of individual subreaches for these reaches. Using the average (not rounded down to the nearest 5 MPH) in the calculations. This resulted in an average increase of 0.14% in the construction costs. This is not considered significant.		X			Y	6/19/2015
23	23	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach D (alt 1)	5/22/2015	Slurry wall is down center of bike trail which is currently paved but no asphalt replacement included in estimate for repair of this path. Haul route repair description does not appear to cover this item.		6/4/2015	No quantities were provided for this in the Civil Design QTO but it is quite evide from Google Earth. Bike Trail is from ~STA 145+00 to 216+00 and appears to be about 20' wide. Quantities for removal of bike trail, replacement of AC portion of bike trail, and bike trail striping have been added as Relocations. Quantities for ABC below bike trail are included in ABC for levee.	X				Y	6/19/2015
24	24	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach E	5/22/2015	Slurry wall is down center of bike trail which is currently paved but no asphalt replacement included in estimate for repair of this path. Haul route repair description does not appear to cover this item.		6/4/2015	No quantities were provided for this in the Civil Design QTO but it is quite evide from Google Earth. Bike Trail is from ~STA 247+00 to 250+00 (20' w) and ~STA 317+00 to 343+00 (12' w). Quantities for removal of bike trail, replacement of AC portion of bike trail, and bike trail striping have been added as Relocations. Quantities for ABC below bike trail are included in ABC for levee.	X				Y	6/19/2015
25	25	Joe Reynolds, (916) 557-7573,	MII - ARS - Reach F	5/22/2015	ABC notes not clear that it includes the topping on the levee.		6/4/2015	Titles for ABC changed to reflect ABC at levee crest and levee maintenance road	X				Y	6/19/2015

26	26	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach G	5/22/2015	Appears headwall might need to be built out into middle of access road to business on south end of this improvement		6/4/2015	Response from Civil Designer (James Elsberry) - I would think that we would be able to dowel and bolster up this wall where it currently stands. There may need to be some fill brought in to tie-off the extra 1-2 foot of raise through the parking lot, or as comment #27 alludes to, the temporary floodwall system may be altered to add another board or two. We shouldn't need to extend the current length because it would be past the beach levee. If levees were to overtop just downstream, the ARS basin would be isolated. See comment attachment #26-27 (pdf of Google Earth snapshot with comments).		X			Y	6/19/2015
27	27	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARS - Reach G	5/22/2015	Appears existing deplyoable temporary emergency headwall will need to be modified to account for headwall raise. (In GE it appears that there is a concrete band in the existing asphalt that has removable plates to install temp posts.		6/12/2015	Response from Civil Designer (James Elsberry) - I would think that we would be able to dowel and bolster up this wall where it currently stands. There may need to be some fill brought in to tie-off the extra 1-2 foot of raise through the parking lot, or as comment #27 alludes to, the temporary floodwall system may be altered to add another board or two. We shouldn't need to extend the current length because it would be past the beach levee. If levees were to overtop just downstream, the ARS basin would be isolated. See comment attachment #26-27 (pdf of Google Earth snapshot with comments). NOTE from Cost Engineer - This appears to be a stoplog structure. Rough costs have been added assuming a 2 ft added height.	X				Y	6/19/2015
28	28	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.a		5/26/2015	Remove RR ties & track: is missing all removal from site (trucking & disposal). Keep in mind that the rail weighs about 35#/lf and will be cut in ~ 40' lengths		6/5/2015	Added removal costs, assumed 18 TN loads	X				Y	6/19/2015
29	29	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	There are several areas along this reach that will require special care during construction. Design branch needs to give you information or assumptions of scope for these areas. See me if you have questions as to where. These areas are readily visiable on Google Earth		6/5/2015	Response from Civil Designer (James Elsberry) -pump sta at LM 9.91: I would say that this area would be analyzed futher in PED to determine whether or not slope stability is even a problem here. The access ramp provides additional width to levee and serves as a stability berm (to a degree) and therefore geotextile may not need to be applied here. A fix type 3B was proposed here, however, it may be suitable for jetgrout depending on whether or not service of this utility can be interrupted. -It's unlikely that the freeport bridge area would require slope stability measures, it's a very wide levee here. If stability was still a concern it would likely be applied on the east side of hwy 160, where the embankment slopes gently down into the golf course. -marina wall: assume removal of keystone wall, placement of geotextile, and slope back from existing into parking lot. The real estate costs will handle the damages for taking and relocating some of their parking. See comment attachment #29 (pdf of Google Earth snapshot with comments). Note from Cost Estimator - quantities for geotextile and slope back are assumed to be covered by the quantities per the QTO as these were developed from cross-section templates. Costs have been added for removing keystone wall and parking lot paving. From above, assumes keystone wall IS NOT replaced.	X				Y	6/19/2015
30	30	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	Levee Stripping, to Spoil: Does not appear to have dump fees included unless there is a reason not to include.		6/4/2015	Spoil site is assume to be the borrow site, but this is left up the contractor. Material should be similar to the degraded levee spoil.		X			Y	6/19/2015
31	31	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	Levee Excavation, to Stockpile (Degradation of Levee): Consider reviewing this reach. Not all areas will allow this type of operation		6/5/2015	Turning on Terrain in Google Earth and taking measurements at what appears to be levee hinge points shows the typical top width of the leveee, even when RR present on 20 ft. This should be adquate to allow the levee degrade operation assumed.		X			Y	6/19/2015

32	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	Levee Excavation, to Spoil (Degradation of Levee)	5/22/2015	comment is the same as 31		6/5/2015	Turning on Terrain in Google Earth and taking measurements at what appears to be levee hinge points shows the typical top width of the leveee, even when RR present on 20 ft. This should be adquate to allow the levee degrade operation assumed.		X			Y	6/19/2015
33	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARN - Reach A	5/22/2015	I'm assuming that Engineering gave you the quantity assumptions used in the estimate. From out conversations, it appears the same section used for American River is the same as that used for Sacramento River, they typically have little in the way of "fixes". See comment 35.		6/5/2015	Per the Civil Designer (James Elsberry) Yes, we did use the same 'bank' or 'no bank' section for both sides depending on the existing condition. The thought process here was that even if we made more cross section details for estimates, we still would be adapting the design to provide the same amount of launchable rock quantity (to address scour and erosion). In early estimates, we did have more cross sections and found that the quantities did not change significantly. Therfore, at the time we reduced the effort to a typical section since rock is the major cost driver for erosion protection fix, and the quantities would be designed very similarly.			X		Y	6/19/2015
34	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARN - Reach B	5/22/2015	Fish monitoring included in "Fish & Wildlife mitigation", However there will be no inwater work in this reach. Is this item needed?		6/12/2015	Per the Environmental Planner (Anne Baker), The fish monitoring is for Green Sturgeon – critical habitat for Green Sturgeon goes to the Highway 160 Bridge on the American River, and all of the Sacramento River reaches. The monitoring would be mitigation efforts for effects we have on Green Sturgeon. The geographic extent of where we would be monitoring has not been determined yet – it is still being sorted out through our ESA consultation. But the likelihood is that we may have monitoring activities occurring anywhere that is critical habitat for green sturgeon in the study area. Additionally, we are assuming that we are having in water work on both rivers. It is only the reaches where we do launchable trench where there would be no in-water impacts. Removing the line item from Reaches B and C on the American River is reasonable, but make sure to maintain the same total for the fish monitoring effort, because that was based off of the efforts on SacBank. NOTE: Fish Monitoring removed from this reach. Per the requirement of the Environmental Planner, spread between other reaches on American River.	X				Y	6/19/2015
35	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	Most if not all of the Fish and Wildlife Facilities work would be appropriate if the levee touched water, but the project levees in this reach do not normally touch unless the storm flows breach the normal river banks and actually get to the levees which are significantly away from the banks.		6/5/2015	Per the Civil Designer (James Elsberry) - We do have erosion protection work in Reach B, but not a lot (1000').		X			Y	6/19/2015
36	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARN - Reach C	5/22/2015	See comment 35		6/5/2015	Fish and Wildlife Mitigation for Reach C is mitigation for vegetation removal, not fish monitoring.		X			Y	6/19/2015
37	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	Hydroseed application time appears low. What does "Prep time" consist of? Does the .5 acr/hr include the double placement? Rough SWAG would hav been ~$4k/acre which includes mob/demob of crew/equip.		6/12/2015	Changed method of calculating these costs to using Cost Book assuming costs similar to seeding with field mix. This gave aunit costs of $4350/ACR.	X				Y	6/19/2015
38	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	Levees and Floodwalls (Sta 39+50 to 52+00; cutoff wall): Estimate appears to be missing replacement of existing AC at top of existing levee.		6/5/2015	Levee is NOT topped with AC in this area (ABC only)		X			Y	6/19/2015
39	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	Base rock placement looks short time wise. It is only 727 tn, but the thickness is thin, width is short and length is long. Consider 2 day min.		6/5/2015	Combined tonnage of ABC for the reach is actually 859+727=1586 TN. Total time for placement is 18 days calculated, 20 if productivity is factored in. Length is less than a mile combined. UC is almost $80/ton		X			Y	6/19/2015
40	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	CL stripe at (E) bike path		6/5/2015	Levee is NOT topped with AC in this area (ABC only)		X			Y	6/19/2015

41	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	It appears that levee improvements from station 49+50 to 65+00 may have been built already or are in final design stage. Please verify that this reach is needed in this project and can be removed from this project.		6/12/2015	Per Civil Designer (James Elsberry) The quantities under the feasibility folder <\\amethyst\civcad_2\AmerRiv\CommonFeaturesGRR\Civil\Feasibility Quantities\Alt 1\ARN> have accounted for the WRDA99 NEMDC North project. See comment attachment #41 for approximate clearances at the Arden Garden Connector Bridge in ARN Reach C. Suggest estimating the jet grout portion as 80' long x 80' deep = 6400SF. NOTE from Cost Engineer: Replaced 6400 SF of DSM Wall with Jet Grouting.	X				Y	6/19/2015
42	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARN - Reach D	5/22/2015	Estimate missing removal of existing floodwall from ~sta. 68+00 to 110+00		6/12/2015	per Civil Designer (James Elsberry)Correct, originally we were just bolstering the existing wall along Arcade Creek because we did not have seepage improvements. However, the current geotech appendix has seepage/stability improvements for the whole length of Arcade reaches. Therefore, we cannot build the cutoff wall without the demo of existing floodwall and subsequent rebuild of a new larger floodwall. Reach F and G do not have existing floodwall. NOTE from Cost Engineer - Demo/Removal of existing concrete floodwall has been added to ARN, Reaches D and E	X				Y	6/19/2015
43	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	Has additional time been added to production for crossing the major streets in this section? (Rio Linda Blvd, bike path, Norwood)		6/12/2015	Production Rate has been reduced for the crossings of major streets		X			Y	6/19/2015
44	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	Repair of existing asphalt & concrete at the road crossings?		6/12/2015	Costs have been added for resurfacing AC and concrete at road crossings for Reaches ARSA, ARND and ARNE.	X				Y	6/19/2015
45	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	There are several storm drain closure valves along this reach. I do not see where the pipes are dealt with in any manner. Is there anything that needs to be done with these" (83+00 is in estimate, structures at 93+00, 102+50, 106+00 not in estimate)		6/12/2015	Excavation, removal and replacement of pipe added to estimate. Per the Relocation Inventory for Reach D, these stormdrains have existing positive closure structures. (Assumed Util Fix 3A, sans positive closure structure).	X				Y	6/19/2015
46	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARN - Reach E	5/22/2015	From station 70+00 to 110+75 (~4075 lf), there appears to be a concrete flood wall. Estimate includes the construction of 4400 lf of floodwall. Is estimate appears to be missing the removal of this wall for the degrade of the new slurry wall.		6/12/2015	per Civil Designer (James Elsberry)Correct, originally we were just bolstering the existing wall along Arcade Creek because we did not have seepage improvements. However, the current geotech appendix has seepage/stability improvements for the whole length of Arcade reaches. Therefore, we cannot build the cutoff wall without the demo of existing floodwall and subsequent rebuild of a new larger floodwall. Reach F and G do not have existing floodwall. NOTE from Cost Engineer - Demo/Removal of existing concrete floodwall has been added to ARN, Reaches D and E	X				Y	6/19/2015
47	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	Between stations 70+00 to 100+00, there appear to be several SD vaults with cooresponding outfalls shown on GE. Estimate does not indicate any relocations within these stations. Are these missing from the estimate/relocations list?		6/12/2015	Excavation, removal and replacement of pipe added to estimate. Per the Relocation Inventory for Reach D, these stormdrains have existing positive closure structures. (Assumed Util Fix 3A, sans positive closure structure).	X				Y	6/19/2015
48	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	Please review fiber roll cost. $8/lf direct cost looks high. Maybe look at CalTrans for comparison		6/5/2015	Per CalTrans Historic Costs, this number shoud probably be more in the $4-$5/LF contract cost. Change made typically reflects $3.50/LF sub bid, $4.59/LF contract cost.	X				Y	6/19/2015
49	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	Silt Fence Install: Consider adding riding trencher to help production of installation of fence.		6/5/2015	Per CalTrans Historic Costs, this number shoud probably be more in the $4-$4.50/LF contract cost. Adding trencher and bumping production to 120 LF/HR gives a contract cost of about $4.22/LF.	X				Y	6/19/2015
50	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARN - Reach F	5/22/2015	Review this reach with engineer. More effort shold be done on the portion of wall that goes underneath I-80 bridge. Can excavator method or DSM physically be used or will jet grout be required?		6/5/2015	Discussed with Civil Designer, changed estimate to reflect jet grouting instead of DSM under bridge. Length of wall under I-80 would be ~145' at 80' depth = 116,000SF.	X				Y	6/19/2015

51	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		5/22/2015	Please review the haul costs associated with this reach. Access is limited due to RR and crossing points are beyond the reach limits		6/8/2015	Haul Costs revised to reflect longer access. Length of haul along levee increased to reflect 3.8 MI of levee.	X				Y	6/19/2015
52	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARN - Reach G	5/22/2015	There is a power line at 25+50. How does this effect construction efforts?		6/8/2015	Power line will not affect construction efforts in this reach. Work is from Sta ~93+00 to 117+25	X				Y	6/19/2015
53	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARN - Reach H	5/22/2015	No work, no comments		6/8/2015	FIO			X		Y	6/19/2015
54	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	MII - ARN - Reach I	5/22/2015	Box culverts mentioned in estimate, where is it being constructed?		6/8/2015	This quantity comes from the Magpie Creek CAP study quantities (basis for the work done in Reach I). The box culverts will actually be constructed in Reach G, where there is a bike trail that parallels Rose St and crosses the levee. There is a bike trail bridge over the Magpie Creek channel just North of the levee (between ARN-G Sta 90+00 to 95+00). The culverts will be built roughly adjacent to the bridge.			X		Y	6/19/2015
55	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	ARCF_GRR_SBW-Extend_Bridge (Alt2) MIIv4.2 141020	6/3/2015	Quantity of rail material is incorrect. 100 #'s is the correct weight per yrd (3 ft). Actual weight required is 33.3 #'s/lf = 106,560 #'s		6/8/2015	Weight revised to reflect 100 LB/YD (33.33 LB/LF) NOTE: # of ties revised to reflect 19.5" spacing	X				Y	6/19/2015
56	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil		6/3/2015	Verify quantities of tie plates, spikes. Quantities not making sense when comparing with Excel quantity sheet		6/8/2015	Revised quantities to reflect 2 tie plates per tie and 4 spikes per tie plate	X				Y	6/19/2015
57	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	TPCS form Alternate 1.	6/3/2015	Verify mid-points of construction. See spreadsheet that calculates midpoints. Keep in mind that the formulas are written to start at beginning of "Pre-construction" and end at the last task. Some of these are by construction season. Check not done on Alt2 but presume similar issue.		6/8/2015	Mid-points of construction will be verified from SS after final MII estimate completed.	X				Y	6/19/2015
58	Joe Reynolds, (916) 557-7573, Joe.L.Reynolds@usace.army.mil	TPCS form	6/3/2015	All numbers have not been reviewed and will be reviewed at a later time prior to Cost Cert. This will be an itterative process and will need to be looked at again.		6/8/2015	FIO			X		Y	6/19/2015
59	Cameron Sessions, (916) 557-7896, Cameron.L.Sessions@usace.army.mil	Total Project Schedule	6/1/2015	Default Calendar for design is 5 day per week which provides a conservative timeframe at this stage of development	Robert Vrchoticky (916) 557-7336, Robert.D.Vrchoticky@usace.army.mil	6/3/2015	FIO			X		Y	6/19/2015
60	Cameron Sessions, (916) 557-7896, Cameron.L.Sessions@usace.army.mil		6/1/2015	Plant Maintenance is an important feature of the schedule, but the roll up calendar does not break out this information in a clear manner. Construction is complete in Sept 2028; however, plant maintenance extends the overall duration out to Jan 2031. Consider grouping "Plant Maintenance" as a Maintenance group instead of including with construction in order to better convey the split in total time between construction and plant maintenance.		6/18/2015	Plantings 'Maintenance' (Establishment) has been split from Construction	X				y	6/19/2015
61	Cameron Sessions, (916) 557-7896, Cameron.L.Sessions@usace.army.mil		6/1/2015	Task 3 "Collect field explorations" does not have a predesessor activity, but has a start constraint assigned for October 2017. Please confirm this is the intended start of the activity and consider removing the constraint if possible.		6/18/2015	Constraint removed. Start Date entere into Project Information	X				y	6/19/2015
62	Cameron Sessions, (916) 557-7896, Cameron.L.Sessions@usace.army.mil		6/1/2015	Task 473 "Vault Foundation" does not have a predesessor activity		6/18/2015	Task has been given a predecessor activity	X				y	6/19/2015
63	Cameron Sessions, (916) 557-7896, Cameron.L.Sessions@usace.army.mil		6/1/2015	Task 709 "Levee Excavation" does not have a predesessor activity		6/18/2015	Task has been given a predecessor activity	X				y	6/19/2015
64	Cameron Sessions, (916) 557-7896, Cameron.L.Sessions@usace.army.mil		6/1/2015	There are 317 tasks without successor activities. Without proper assignments, it can be impossible to reflect a true critical path or understanding of the project		6/18/2015	All tasks have been given a successor activity	X				y	6/19/2015

65	Cameron Sessions, (916) 557-7896, Cameron.L.Sessions@usace.army.mil		6/1/2015	The level of detail regarding construction and utility relocations is very detailed and appears to be very thourough for this stage of design		6/3/2015	FIO			X		y	6/19/2015
66	Cameron Sessions, (916) 557-7896, Cameron.L.Sessions@usace.army.mil		6/1/2015	Durations: There are 225 activitys with a duration of 5hrs - at the feasibility stage it is not normally recommended to have durations of less than 1 day. No need to revise, but please note for future estimates/schedules.		6/3/2015	FIO			X		y	6/19/2015

REVIEWER
BACK CHECK COMMENT **(Needed Only If NOT Closing Comment)**
Item will need to be updated to latest labor rates before you/we finalize TPCS prior to certification. Okay for now.

USACE District Quality Control / Quality Assurance

Project: American River Watershed Common Features, General Re-Evaluation Report (ARCF GRR)
Submittal: Attachment E, Erosion Protection Report
Section: Hydraulic Design Section (CESPK-ED-HD)

Hydraulic Design Documentation and Products reviewed:

1. Document, American River Watershed Common Features, General Re-Evaluation Report, Erosion Protection Report, Draft Version, Dated January 23, 2014

File Location:
\\amethyst\civcad_2\AmerRiv\CommonFeaturesGRR\Hydraulics\Erosion\ErosionSummary_ForGRR\DQC_Review\Certification\

Limitations of Review:

The review is limited to the document which is a summary of existing documents, analysis, models, and data. The review does not include review of the referenced documents, analysis, models, or data. The review of these was conducted separately.

(1) Designers: We have prepared the above products in accordance with the Quality Control Plans meeting project requirements, standards of the profession and US Army Corps of Engineers policy, essential engineering guidelines and standards. All comments resulting from DQC review have been entered into DrChecks and resolved.

_____ 2/11/2014
Todd Rivas, P.E., Senior Hydraulic Engineer, CESPK-ED-HD Date

_____ 2/11/2014
Scott Stonestreet, P.E., Senior Hydraulic Engineer, CESPK-ED-HD Date

(2) DQC Reviewer: I have reviewed the above products and find them to be in accordance with the Quality Control Plans. This includes review of assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. All comments have been entered into DrChecks and resolved to my satisfaction.

_____ 2/11/2014
Ethan Thompson, P.E., Senior Hydraulic Engineer, CESPK-ED-HD Date

(3) QA Reviewer: I have performed Quality Assurance review of the above products and confirm that all critical and technical issues resulting from DQC/QA review have been addressed. All DQC comments and responses are loaded into DR Checks under Project ID: "*149827 GRR*", Project Name: "ARCF - General Reevaluation Report (GRR), TSP & Attachments, American River Common Features (ARCF)," Review Name: "*DQC Erosion Attachment*".

_____ 2/11/2014
Jesse Schlunegger, P.E., Acting Chief, Hydraulic Analysis Section, CESPK-ED-HA Date

_____ 2/11/2014
Greg Kukas, P.E., Chief, Hydrology and Hydraulic Branch, CESPK-ED-H Date

Comment Report: All Comments
Project: ARCF - General Reevaluation Report (GRR), TSP & Attachments, American River Common Features (ARCF), California (P2 #149827)
Review: DQC Erosion Attachment (23-29 Jan 2014)
Displaying 96 comments for the criteria specified in this report.

Id	Discipline	Section/Figure	Page Number	Line Number
5501895	Civil	n/a	Page 22	n/a

Comment Classification: **For Official Use Only (FOUO)**

Page 22, 3rd paragraph, second to last sentence, change "regarding" to "regrading".

Submitted By: Markus Boedtker ((916) 557-6637). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**
Thanks. Text has been changed to "re-grading".

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Markus Boedtker ((916) 557-6637) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5501899	Civil	n/a	Page 58	n/a

Comment Classification: **For Official Use Only (FOUO)**

Page 58, paragraph 6.2, it should be recommended that the most recent Sac Bank designs should be used as the template for the bank protection design, due to this being the most recently coordinated design that does not require additional mitigation, other than the instream woody material, willow pole cuttings, and soil-filled quarry stone with various native plants and trees planted on the entire slope.

Submitted By: Markus Boedtker ((916) 557-6637). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**
The current design concept was developed with PDT input including geotechnical design and environmental planning. It has been analyzed and described within the EIS and any additional mitigation has been assessed (and costs added).

It is agreed that this design should be analyzed further in PED to determine if there's a more effective design but the current design should provide adequate costs for alternative selection.

Submitted By: Thomas Goebel (916-557-7175) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Markus Boedtker ((916) 557-6637) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5501904 Civil Figure 6-1 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Figure 6-1 should be changed to the most recent Sac Bank design showing in-stream woody material, soil-filled quarry stone, and native trees and shrub plantings along the entire slope. This design is the only one that does not require additional mitigation outside of the bank protection work.

Submitted By: Markus Boedtker ((916) 557-6637). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**
The current design was developed with input from the PDT including geotechnical design and environmental planning. This design has been determined to be adequate to develop costs for alternative selection. For feasibility design, the PDT will need to either refine or revisit the design to determine if it is effective in setting costs for PED. Additional design effort or cost and schedule risk analysis will be performed to ensure costs are adequate for PED.

In PED, the final design will be determined based on additional analysis and coordination with environmental planning, geotechnical design, levee safety, and others.

Submitted By: Thomas Goebel (916-557-7175) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Markus Boedtker ((916) 557-6637) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5502007 Civil n/a General Comment n/a

Comment Classification: **For Official Use Only (FOUO)**

This report is actually confusing. The report is the erosion attachment of the Common Features GRR and therefore it should evaluate the erosion and the necessary erosion protection for all channels considered in the American River Basins (north and south). It should describe in the same manner all channels such as Sacramento River north and south of the American River, American River, Natomas Cross Canal, NEMDC, Arcade and Dry Creek, eventually Pleasant Grove Creek if considered necessary. The erosion on the American River was detailed studied at the request of an expert elicitation team. Therefore there were additional subsurface investigations performed in the

riverbanks and riverbed to evaluate the erosion conditions of the soils. The results of this additional study should be included as a separate enclosure to this report and only the conclusion of the study and the proposed remediation actions should be described in the main erosion appendix. As the report is structured it goes back and front from detailed analyses and descriptions (for American Rover) to poor or lack of description, or even wrong description, of the conditions of the other channel.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**

Intro section text has been revised to clarify how erosion was handled on each reach for the study. Some reaches were handled as part of the Natomas PAC, and other small reaches were assumed to need minimal additional erosion analysis that will be deferred to PED.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5502023 Civil 1.3 BAckground n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Since this is the erosion report for the entire project area this figure should show also the Natomas Cross Canal and the levees on the Arcade and Dry Creek and the other tributaries discussed in the text. If these tributaries have no impact it should not even be mentioned in the text (i.e. Feather River is also a tributary and is not included). Also each channel name should be shown on the figure not only the American River and Sacramento River. This report will go to ATR outside the district which don't really know where these channels are located.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**

Intro section text has been revised to clarify how erosion was handled on each reach for the study. Some reaches were handled as part of the Natomas PAC, and other small reaches were assumed to need minimal additional erosion analysis that will be deffered to PED.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 07 2014

Current Comment Status: **Comment Closed**

5502024 Civil 1.3 & 1.4 Background n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

The background description of the Natomas Cross Canal, NEMDC, Arcade and Dry Creeks should also be included

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**

Intro section text has been revised to clarify how erosion was handled on each reach for the study. Some reaches were handled as part of the Natomas PAC, and other small reaches were assumed to need minimal additional erosion analysis that will be deffered to PED.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5502026 Civil 1.3 Background n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

The study done by AYRES in 20032 is complex and should be also used and listed in the references.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **For Information Only**

I am not aware of an Ayres report dated 2002; however, section 1.7.1.4 of the erosion report summarizes the 2-D analysis Ayres conducted which computed 2-D velocities and shears for a range of large steady-state discharges (Lower American River, Erosion Susceptibility Analysis for Infrequent Flood Events" dated July 2004 by Ayres Associates). Furthermore examples of the results from this investigation are presented in Section 4.2.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5502029 Civil 1.3 Background n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

This is the erosion report for the entire American River Basin which includes the north and south basins with the tributaries and also Sacramento River. The report should clearly justify why the additional investigation was performed only in the American River riverbad and not also on Sacramento River, particularly that there is a known extremely deep (about 80 feet) scour in the Sacramento River close to the confluence with the American River.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**
The erosion report is for the American River Common Features GRR. Text has been added to clarify how erosion conditions were addressed for each of the reaches in the study. The Sacramento River below the confluence does have an assessment of the erosion conditions in this report.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5502086 Civil 1.4 Background n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

The title Middle Reach – Verona to Sacramento, it does not really make sense. Is this the City of Sacramento or only on Natomas? It should be described probably as Verona to American River confluence. Same to the next reach of the Sacramento it should be described as Confluence with the American River to Freeport eventually. Just River Miles are not sufficient to describe the reach. Show these reaches also on Figure 1-2

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**
This text has been revised to remove the "middle" terminology and include more description of the reach.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5502091 Civil 1.4 Background n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

As a general comment, the report is mostly an HH report but also it is related to levees. Therefore, it would be nice to have also the levee unit and levee mile shown in parentheses, since this is the unit shown on the O&M manuals

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**

I concur that it would be "nice" to include a lot of the detailed mapping and other supporting information in th erosion report. However, inclusion of this information could require a lot of effort (which isn't readily available) and as stated in the comment, it is already available in the O&M manuals should this information be required. I am not sure how providing this detailed information would add to the discussions present in the document. The levee units and/or levee stationing is not referenced anywhere within the document.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5502150 Civil 1.4 Background n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Sacramento River South. There is a scour hole (stable in the last years) about 80 feet deep in the Sacramento River south of the American River. Even if the location of the channel did not move the last 150 years there are scours that should be considered and riverbank and levee erosions during high flood events that should be considered.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**

Clarified that even though the channel has not changed location much in 150 years, that local scour and erosion issues can still develop. Here is the language:

"The location of the channel has been relatively stable for the past 150 years although local scour and erosion can still be an issue."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5502151 Civil 1.4 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

The description of the two reaches is wrong. The riverbanks are more used by the public on the Sacramento River north reach where there are houses and restaurants constructed on the waterside of the levees plus numerous docs. Both levees on the middle and south reaches are constructed of sand. What is typical on the middle reach closer to the American River is the fill placed on the riverbank against the levee and the numerous structures (residence and commercials) constructed on the fill. The south reach has no structures on the waterside of the levee but heavy vegetation, boat docks and indeed boating activity. Show a picture on the middle reach with boats and houses on it since this is the typical there. Indicate also the south reach has rock protection on the majority of the reach but there are places where the rock is missing.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Check and Resolve**

This section can be re-worded. Below is how this was done. The main changes are noting the waterside structures in the middle reach, noting that the middle reach is also constructed in the same manner as the south reach, and clarifying the general public foot access along the south reach contributes to levee and bank erosion while the waterside private residences of the middle reach limits the public access along the levee and banks.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 07 2014

2-0 Evaluation **Check and Resolve**

I believe the word "middle" was either removed or clarified and discussed in the revised text. This revised text should be available soon (maybe by close of business today).

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

Backcheck not conducted

Current Comment Status: **Comment Closed**

5502154 Civil 1.4 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Background description of the other channels (NCC, NEMDC, Arcade and Dry Creek) is missing. A brief description of these channels should be included, at least to justify why there is no analyses done and no protection recommended.missing

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **For Information Only**
Please refer to Section 1.3, paragraph 3, exclusion of these tributaries from this report (including the rational for doing so) is discussed therein.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5502156 Civil Figure 1-4 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Add (or replace this one)a picture of the Middle Sacramento River showing the fill on the waterside and the constructions on the fill.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**
Replaced with aerial photo showing the waterside fill with houses on top of the fill.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5502160 Civil Par. 1.5.1 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Was the discharge in 1986 130,000 or 134,000 cfs?

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **For Information Only**
Verified with Marcia Bond that the peak release from Folsom Dam was 130,000 cfs from report put together immediately after the event. Verified this by looking at actual gage records, too. Other gages downstream may have recorded higher discharges due to additional inflows and this may be where some people think of the peak flow in the LAR as 134,000 cfs. But the peak discharge from Folsom Dam was 130,000 cfs.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5502161 Civil Par. 1.5.1 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

I believe significant erosions occurred also after the 2006 flood event.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**
Added language to clarify:

"In addition, erosion also occurred during a flood event in 2006."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5502167 Civil Par. 1.5.2 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

It is important to describe more the bypass system and when it was constructed. This study will be reviewed by ATR and others outside the district and it is important for them to understand the bypass system and how it works.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **For Information Only**
The erosion report focuses on the segments of the lower American River and the Sacramento River in the study area. The report is an attachment to the Engineering Appendix which supports the GRR documentation. Those reports should provide an adequate description of the overall flood control system without the erosion report having to duplicate that information.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5502172 Civil Par. 1.5.2 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

The subparagraph describing how the levees were constructed is wrong. Levees on the Sacramento River north and south of the American River, considered as part of this study were all constructed in the same manner, of dredged material from the river, and therefore these levees have the same consistency of fine uniform sand extremely erodible. The difference is the fill placed on the riverside berm north of the American River where all these buildings were constructed.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**

The paragraph was written to only describe the construction of the Sacramento River levees south of the American River confluence. The comment describes the method used in construction of the Sacramento River levee north of the American River. The text has been revised to describe the construction of the Sacramento River levees both norht and south of the American River confluence. The levees on the Sacramento River in Natomas were constructed with trainer dikes using excavated material from the center of the levee by dragline. The core was then filled using hydraulic dredges placing fine sand. There is no information which shows this was the case on the Sacramento River leves south of the American River. Instead the best information availble indicates the levees were constructed with clamshell dredges placing material on the channel bank to enlarge the original levee constructed in the mid 1800's.

Submitted By: Michael Kynett (916 557 7898) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 07 2014

Current Comment Status: **Comment Closed**

5502182 Civil Fig. 1-8 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

The Figure 1-8 represents flood fighting of seepage and slope instability of the levee and has nothing in common with erosion. Remove and replace it with an erosion picture but not with a seepage and slope stability issues picture

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**

Photo deleted. The intent was to show levee performance during a flood on the Sacramento River regardless of failure mode and this photo was available. However, it can be confusing to have a seepage/slope stability photo in a document focusing on erosion and therefore is deleted.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5502195 Civil Par. 1.5.2 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

The conclusion of the paragraph contradicts the paragraph 1.4 -Background, that indicated that the erosion on the Sacramento River is mostly due to waves created by boating and public activity

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Check and Resolve**
Section 1.4 concludes by stating:

"The causes of erosion in this reach are boat wake, wind-wave, mass failure, fluvial processes, and public use."

Section 1.5.2 states by stating:

"Since the completion of the Sacramento River Flood Control Project, significant floods have caused considerable erosion related damage to the levee system."

Erosion during floods occurs by fluvial process and it therefore appears to be consistent with section 1.4 where fluvial processes is mentioned as one of the erosion mechanisms.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 07 2014

2-0 Evaluation **Check and Resolve**
Fluvial processes (section 1.4) = erosion by floods (section 1.5.2. So I believe they are consistent. Is there some specific language that you want changed?

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014
Backcheck not conducted
Current Comment Status: **Comment Closed**

5502206 Civil Par. 1.6 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Even if there were no significant erosion observed at locations with concrete rubble on the slope, concrete rubble is not recommended for slope protection. It may hide undetected rodent holes or erosions underneath the concrete, there is no bedding or filter material between the rubble and the levee and also there is no correct rock size distribution. The only restriction in the past was that there should not be any R-bars sticking out of the rubble for safety of boating and other public activity.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **For Information Only**

Agree. The erosion report is only reporting observations of conditions from monitoring and is not endorsing use of concrete rubble.

Text changed to clarify:

"These sites reportedly have concrete rubble (does not meet USCAC standards) on the bank and at the toe that is in poor condition; no significant changes in condition have been observed between annual inspections."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 07 2014

Current Comment Status: **Comment Closed**

5502211 Civil Par. 1.6 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

The title should not be DWR but CVFPB

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**

Thank you. The text will be corrected.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5502619 Civil Par. 1.7.1.1 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Somehow erosion of the riverbed and riverbanks has been mixed with seepage and stability. I agree erosion has an impact on seepage or piping and on the stability and this may need to be more detailed discusses (such as shortening the seepage path, undermining the levee foundation leading to slope failure and so on). But as it is explained and related to scouring and exposure of bridge footing it does not make sense.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Check and Resolve**

Paragraph 1.7.1.1 is a summary of a relatively comprehensive geomorphic analysis. It includes mutliple different observations and recommendations. One observation is that degradation could undermine levee foundations. Another observation is that seepage and piping may be more of an issue than erosion. However, it does not link the seepage and piping to scouring and exposure of bridge footings.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 07 2014

2-0 Evaluation **Check and Resolve**

The following was deleted per recommendation by Mike:

"The report concludes that bank erosion is less of a problem as compared to seepage or piping although the report cites specific locations where erosion protection is needed."

The only place where the term "seepage" is now used in this section is:

"It is important to note that at the time this report was written, many of the seepage and stability mitigation features had not been constructed along the LAR."

This last sentence is important to keep so that the reader is aware of the time context of the statements and recommendations made by the report.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

Backcheck not conducted

Current Comment Status: **Comment Closed**

5502621 Civil Par. 1.7.1.4 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

What was the reason of the selection of the flow of 145,000 cfs?

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**

This section of the document is a summary of work already performed. At one time, this flow was one of the design flows for additional work at Folsom (the enlarged outlets that were then changed to a Spillway).

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5502622	Civil	Par. 1.7.1.	n/a	n/a

Comment Classification: **For Official Use Only (FOUO)**

Why is Ayres study done in 2002 for USACE not included. It has important information on shear stresses and velocities associated with different discharges.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **For Information Only**

I am not aware of an Ayres report dated 2002; however, section 1.7.1.4 of the erosion report summarizes the 2-D analysis Ayres conducted which computed 2-D velocities and shears for a range of large steady-state discharges (Lower American River, Erosion Susceptibility Analysis for Infrequent Flood Events" dated July 2004 by Ayres Associates). Furthermore examples of the results from this investigation are presented in Section 4.2.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5502624	Civil	Par. 1.7.1..5	n/a	n/a

Comment Classification: **For Official Use Only (FOUO)**

What is the frequency associated with 160,000 cfs and why was this the analyzed discharge?

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**

This section of the document is a summary of work already performed. The flow of 160,000 cfs was chosen because that is the design flow of the Joint Federal Project Spillway. The flow of 160,000 cfs is approximately a 200-yr outflow from Folsom and this frequency will be re-evaluated by the Folsom Water Control Manual Update.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5502661 Civil Par. 1.8.1 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Indicate what bench and levee, rich or left bank. Also indicate between what RM the investigation was done.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Check and Resolve**

The erosion attachment was intended as a summary of the erosion study performed as part of the ARCF GRR and as such several details of the study have not been included in the text of the report. We chose not to include a table of explorations as this was considered not a summary item but instead data included in one of the many reference reports.

Submitted By: Michael Kynett (916 557 7898) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 07 2014

Current Comment Status: **Comment Closed**

5502663 Civil Par. 1.8.2 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Were the JET tests performed on samples collected from the riverbed or river banks?

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

Revised Jan 28 2014.

1-0 Evaluation **Concurred**
The erosion rate tests were performed on samples from both banks and from the riverbed.

Submitted By: Michael Kynett (916 557 7898) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5502677 Civil Par. 2. n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Concrete cobbles should be considered as inadequate for slope protection. The voids in the cobbles may be used for rodent animals also there is no bedding material between the cobbles and the levee embankment or riverbank and the erodible fine material may migrate into the voids in the cobble. Also these cobbles may hide defects in the levee slopes such as internal erosions, slope failures, rodent holes and other

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **For Information Only**
Agree. This document is reporting observed conditions from the field and is not advocating or even suggesting that concrete rubble is appropriate for slope protection.

Added a clarifying sentence at the end of the first paragrah in section 2:

"As shown in Figure 6-3, the tentatively selected plan is to replace the historic revetment (e.g. cobble) with modern revetment to protect the banks from anticipated future flows."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5502680 Civil Par. 2 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Par. 2. All the repairs shown on the figures 2-2 to 2-7 show riprap placed 1-2 feet above the water line, when the water was at a pretty low elevation. Is the riprap covered by brush and grass or it is only on a short height of the slope? Is this riprap considered adequate?

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

Revised Jan 28 2014.

1-0 Evaluation **For Information Only**
A channel stability analysis (Ayres Associates, 2010) was used to determine areas requiring revetment with the assumption that all areas without modern revetment will be protected. Modern protection was determined by areas defined as rock riprap with overall condition of good or very good.

Submitted By: Thomas Goebel (916-557-7175) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5502689 Civil Par. 3.1 & 3.2 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Are the par. 3.1 and 3.2 not related only to the American River? If so say that in the title.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 28 2014

1-0 Evaluation **Concurred**
Titles for these two sections have been modified as follows:

3.1 Geologic and Geomorphic Mapping and Analyses of the Lower American River

3.2 3-Dimensional Stratigraphic Model of the Lower American River

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503129 Civil Par. 4,3 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

The threshold analyses is currently ongoing but there are results are not yet available. This project si going on for more than 5 years. If something is not yet ready to be published I believe t would be better not to mention it at all. The report should be complete at this phase not with gaps.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**

Section 4.3 has been deleted as suggested. However, this is used as an example of ongoing work to be completed in the future to address observations and recommendations from the expert panels (section 1.7.2.3, last sentence has been added so it now reads: "The District envisions that, as appropriate, the remaining work efforts will be addressed in future studies. For example, there is currently an ongoing channel widening threshold analysis to support changing operations at Folsom Dam."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5503155 Civil Par. 5.1, Fig. 5-1 & 5-2 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Were the studies by NHC in 2009 and 2012 not done as a contract with USACE? In this case,. Why the channel degradation in Fig, 5-1 and 5-2 are in meters?

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 29 2014

1-0 Evaluation **Check and Resolve**

Figure 5-1 and 5-2 originally started in another (non-USACE and non-NHC related) document that was in meters. NHC plotted new data on top of this borrowed figure for illustration purposes and did not atttempt to find the original data supporting the original work effort and convert it to feet for NHC's report to USACE. However, it still provides good information and the effort and cost to convert these figures to feet far exceed the benefits and it may not be possible. However, it is important that the reader understand these figures are in meters and this as been added to the caption as:

"The elevations are given in meters in NGVD 1929 vertical datum and not in feet."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5503183 Civil Par. 5.4.1 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

It should be mentioned that the erosion component of the fragility curve is part of the judgment curve and was not estimated based on any analyses but on the experience of an expert elicitation panel, considering the location of the index points, the conditions of the foundation and levee material, water velocity at that specific location, and on past history.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**

The discussion in Section 5.4.1, para. 1 will be expanded to include this information. The proposed modification now reads:

"...Furthermore, the engineering judgment component consists of considerations for vegetation, animal burrows, encroachments, utilities, and erosion. It should be noted that the erosion component was not estimated based on any analyses, but on the experience of an expert elicitation panel, considering the location of the index points, the conditions of the foundation and levee material, the water velocity at that specific location, and on past history."

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5503201 Civil Fig. 5-12 to 5-14 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Fig. 5-12 to 5-14 are not representative for the erosion report. The high risk of poor performance of the levee without the project is not due to erosion but mostly due to seepage or stability, erosion being a small part of the curve. The reduction in risk is not after erosion measures are considered but after seepage and stability deficiencies are mitigated. The figures should be replaced with the Judgment curves at the same locations , with or without project, to demonstrate the impact of the erosion control measures and the impact of the erosion on the poor performance of the levee.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**

The report text has been updated to show the judgment with- and without-project curves as figures. The report text has been updated to explain the differences between the with- and without-project curves, the changes to the erosion portion of the curve, the residual risk captured in the with-project judgment curve, that the American River curves capture the existing cutoff walls, and that the Sacramento River combined curve has seepage and slope stability components as well.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503225 Civil Par. 5.4.1 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

How par. 5.4.1 is written, it lead to the conclusion that cumulative probability of poor performance greater than 50% without project is reduced due to erosion measures to less than 20 percent. This is not correct, the majority of reduction of the probability of poor performance is done by the seepage and mitigation measures, and partially only by erosion protection measures. This is the reason I insist to replace the geotechnicalperformance curves with the judgment curves (Figures 5-12 to 45-14) before and after project which indicates the reduction of probability of poor performance by erosion control measures.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
The report text has been updated to show the judgment with- and without-project curves as figures. The report text has been updated to explain the differences between the with- and without-project curves, the changes to the erosion portion of the curve, the residual risk captured in the with-project judgment curve, that the American River curves capture the existing cutoff walls, and that the Sacramento River combined curve has seepage and slope stability components as well.

Submitted By: Michael Kynett (916 557 7898) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 07 2014

2-0 Evaluation **Check and Resolve**
Report should be available by close of business today.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014
Backcheck not conducted
Current Comment Status: **Comment Closed**

5503226 Civil Par. 5.4.2 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Same comment as for Par. 5.4.1 - American River

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**

The report text has been updated to show the judgment with- and without-project curves as figures. The report text has been updated to explain the differences between the with- and without-project curves, the changes to the erosion portion of the curve, the residual risk captured in the with-project judgment curve, that the American River curves capture the existing cutoff walls, and that the Sacramento River combined curve has seepage and slope stability components as well.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 07 2014

Current Comment Status: **Comment Closed**

5503259 Civil Par. Fig 6-1 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

The cross section should indicate what is the material placed within the launchable rock. If this is a launchable rook the mass of rock should move in case of undermining of the slope or riverbed. However, I assume there is a mass of soil within that rock, so the rock will be replaced by that material in case of undermining and the purpose of this launchable rock is lost, unless the entire mass is rock Also, the rock size distribution is dictated by the velocity in the channel. However, this launchable rock is not designed based on any velocity, it is "one size fits all" rock and may be easily washed away by high velocities. Also I am not sure the launchable rock respects the required specification for rock quality.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 29 2014

Revised Jan 29 2014.

1-0 Evaluation **Concurred**

The material within the launchable rock portion of the design will be 100% rock. There is no soil within the rock mass that launches. The launchable section is buried to lower the amount that needs to launch and above that section soil is allowed. The rock size was determined on average velocities and verified with recent designs. The launchable rock (specification) is not as critical as volume of rock in determining costs. The design should provide an adequate volume of rock for alternative selection with actual site specific design occurring in PED.

Submitted By: Thomas Goebel (916-557-7175) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5503280 Civil Par. 6.3. n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

I suggest revising the title of the paragraph removing the word "Trench". This is not a trench but a mass of rock placed on the riverbank. There is no trench excavated in the riverbank of riverbed.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 29 2014

1-0 Evaluation **Non-concurred**

In this case, the launchable section will be placed in an excavated trench along the waterside levee toe. The detail in the erosion protection report is not as clear as the details in the engineering appendix. See attached detail. The Bank Protection method has a launchable component that is on the riverbank.

Submitted By: Thomas Goebel (916-557-7175) Submitted On: Feb 05 2014
(Attachment: engineering_appendix_exerpt.docx)

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5503383 Civil Par 7.1.3 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

It should mention that the raise of discharge due to Folsom Dam modification leading to higher velocities in American River will have no impact on the propose slope protection. The proposed slope protection was not designed based on the velocity or depth of water, it is a launchable rock with no particularly designed rock size based on velocity and it is placed on the levee to the top of the levee. I assume it is to the top of the levee, however I did not see any recommendation regarding the top of slope protection on Sacramento or American River.

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**

We added the following to paragraph 6.1 "The erosion protection was designed to convey the 0.5% ACE (200-year) future condition as described in Chapter 4."

The rock size was determined on average velocities and verified with recent designs. See response to comment 5503390 for discussion on whether design extends to top of levee.

Submitted By: Thomas Goebel (916-557-7175) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503390 Civil Par 7.1.3 n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

General Comment: I understood the proposed protection is either launchable rock of launchable rock trench. However, I did not see any information if the protection on American River is on the riverbank only or it extends on the slope also, and I did not see any information on the height of the slope protection on the levee (if it is extended on the levee also0. One of the issue of the existing slope protection is that height may not be adequate, therefore on some places where the protection exists it needs to be raised either to the top of the levee or to the design water elevation. Also I did not see any conclusion of the extensive erosion investigation on American River on the riverbed erosion and the proposed mitigation (probable the launchable rock trench, but it is not specifically indicated).

Submitted By: Mary Perlea (916-557-7185). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
The erosion protection is either Bank Protection or Launchable Rock Trench. The Bank Protection protects the existing bank away from the levee toe. This toe protection is intended to protect the levee away from the levee and, typically, velocities at the levee are low enough that slope protection isn't required to the crown.

The Launchable Rock Trench will deploy when the existing berm is eroded away. The river will be allowed to meander and, therefore, the velocities along the levees may be high enough to require protection. The end result is a fully-protected slope to the crown.

Submitted By: Thomas Goebel (916-557-7175) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Mary Perlea (916-557-7185) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503634 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 1.1, paragraph 1. Is the rationale for the proposed erosion protection based on a quantification of the risk associated with erosion? Justification for project features normally has to go through such an analysis and that should be discussed further here.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Text added to clarify and confirm that a risk analysis was done for the feasibility study.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503635 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 1.2, paragraph 2. The Natomas PAC did consider erosion, specifically for the Sacramento River north of the American River and the east side tributaries (NEMDC, Natomas Cross Canal, etc). This may not be clear in the PAC documentation, but it should be referenced and discussed. Does this new erosion appendix supersede anything discussed in the Natomas PAC for erosion?

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Intro section text has been revised to clarify how erosion was handled on each reach for the study. Some reaches were handled as part of the Natomas PAC, and other small reaches were assumed to need minimal additional erosion analysis that will be deferred to PED.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503636 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 1.3, paragraph 1. When talking about the system, it is not clear if you are referring specifically to the American River. If so, suggest referring to as the American River levees or American River levee system. It mentions the 1955 event required an emergency flood fight – was that for the American River levees? Please also see paragraph 4 of Section 1.5.1 for similar comment on "system".

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**

I was hoping that the section title "Background – Lower American River (LAR) Overview" would help to tell the reader that this section was focusing on the Lower American River. With that said, the subject paragraph (Section 1.3, 1st para.) has been modified to the following:

"The American River levees were originally intended to convey a release from Folsom Dam of 115,000 cubic feet per second (cfs). During several events since the construction of Folsom Dam, flows have equaled or exceeded the design capacity and caused significant erosion distress. All four significant flood events since the completion of the Federal flood control system in the mid 1950s (1955, 1966, 1986, and 1997) caused considerable damage to the American River levee system due to erosion. The 1986 event had an imminent threat of levee failure. And, all four events required extensive repair after the event so the American River levee system could perform for the next major event. The objective release from Folsom Dam is currently under review as part of the Folsom Dam Reoperations Study and the Joint Federal Project is currently constructing improvements to the dam for a release of 160,000 cfs. Based on past performance and recent investigations, erosion is a serious threat to the American River levees that must be addressed."

Tibbitts let me know that flood fights were along the Feather in 1955 so that sentence has been deleted from the subject para. Additionally, the paragraph (Section 1.5.13, 4th para.) has been modified to the following:

"Sacramento experienced significant flood events again in 1964, 1986, and 1997. The 1964 flood event was the first time the complete American River levee system was tested with a flow of 115,000 cfs. The 1964 flood event showed considerable stress on the levee system for a flow of 115,000 cfs. An emergency flood-fight along the left bank of the American River near H Street was required to pass the flood event."

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**

This looks good, thanks.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5503639 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 1.3, paragraph 4. To help tell the story, it would be good to discuss the purpose for convening the expert panel in 2010 - mainly due to questions and uncertainties regarding previous design recommendations and the environmental sensitivity of doing extensive erosion work on the American River including grade control.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Thanks for the suggestion. The subject paragraph has been modified to:

"Following the 2010 report a panel of experts in engineering fields associated with erosion was convened by West Consultants for the USACE due to questions and uncertainties regarding previous design recommendations and the environmental sensitivity of doing extensive erosion work on the American River including grade control. The panel was tasked to consider the adequacy of studies conducted to..."

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503640 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 1.3, footnote 2. The text appears to be cutoff.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **For Information Only**
No; this short statement was made to differentiate that all of the references to river miles are based on the USGS index and not the Comp Study index.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503642 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

6. Section 1.3, paragraphs 5&6. Paragraph 6 seems to be repeating what is already said in paragraph 5. For clarity, please combine.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Considering that para. 5 told the story of additional data collection and investigations in a past-tense form and para. 6 told the story more from a point of view what was expected of the investigations, I went with just deleting para. 6 since all of the critical information is present in para. 5 and then the past vs. present issue goes away.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503643 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 1.4, paragraph 2. Using the term "middle" reach is confusing for purposes of this discussion. It also mentions multiple diversion structures, but only the Sac Weir is located along this reach.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Text has been revised removing the "middle" terminology. The reference to multiple diversions has been replaced with a description of the Sac Weir only.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503644 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Figure 1-4 and Figure 1-5 should include in the title the river mile or range of river miles they are supposed to represent.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Concur, figure titles has been been revised.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503646 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 1.5.1, paragraph 5. Peak flow for 1986 was 134,000 cfs.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **For Information Only**

Please cite reference for the 134,000 cfs. Please don't include Tibbitts' September 2012 report on the Nov/Dec 2011 Advisory Panel – Dan hasn't been able to cite his source of the 134,000 value. I have spent some time investigating this item and cannot find any documentation that the peak flow (or peak release from Folsom) was anything but 130,000 cfs for the 1986 event. Corps' discharge records for Folsom Dam show a maximum release of 130,000 cfs. Please refer to the attachment which includes excerpts from the Folsom Dam & Lake water control manual (Dec. 1987) and from the Short Period Computation Sheet used during the flood event to track inflow, lake volume, and outflow by WATMAN.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 04 2014
(Attachment: Pages_from_Folsom1987CompleteManual3.pdf)

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5503648 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Figure 1-7. Add text noting peak flow of 115k to Jan 1997 hydrograph.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**

Will do.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

Current Comment Status: **Comment Closed**

5503650 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 1.7.1.4, paragraph 1. Other flows beyond 145,000 cfs were part of the study including 160,000 cfs. This should also be briefly discussed. 145,000 cfs was important because it was the flow used for levee certification.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Added the following clarifying language to the end of the section:

"Other discharges such as 160,000 cfs were also included in this document."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503652 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 1.7.2. For better flow of the document, recommend removing 1.7.2.2 - 1.7.2.4 discussions on hydraulics and sediment transport and moving them up in the hierarchy – so they stand out a bit more. In brief, sections could be set up as follows (Sections 1.8 and 1.9 remain the same):
a. 1.7.2.1 2010 Panel
b. 1.7.2.2 2011 Panel
c. 1.7.2.3 2012 Panel
d. 1.10 Hydraulic and Sedimentation Studies
e. 1.10.1 Sedimentation Studies Completed Tasks
f. 1.10.2 Sedimentation Studies Tasks in Progress
g. 1.11 Levee Screening Tool

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Changes made as indicated.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503653 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 1.7.2.3, paragraph 1. Ayres analysis for bankline migration indicates 1957 to 1998 and then states NHC confirmed Ayres analysis with 1998 to 2010 study. These are different time periods, so not sure how it can be confirmatory. Are the years correct or does there need to be some additional discussion?

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Changed subject sentence for clarity to:

"NHC confirmed Ayres findings of no significant recent bankline migration by using aerial photos combined with survey data from 1998 to 2010 to develop more accurate banklines. NHC noted that significant differences shown in the previous Ayres analysis were the result of Ayres incorrectly identifying the top of bank from aerial images without the aid of relatively accurate topographic data."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503654 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 1.7.2.4, paragraph 1. Is it correct saying USACE has not performed a review? It would seem if we are including results, that some level of review of the information has occurred– it does say results seem reasonable. It would certainly seem appropriate to indicate results are draft and have not undergone the full review process. Please also reference the appropriate section for geotechnical studies so it is clear what the source of the new information for the bed and banks is.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Changed the first paragraph to:

"This information is based on draft results that have not been fully reviewed by USACE and should be viewed with caution as they are subject to change."

Also, added the reference to the geotechnical information, section 1.9.2.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503657 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 1.7.2.4, paragraph 1. The results are called into question based on the hydrologic inputs and notes they should not be used for estimating long term trends, though the results do seem to be discussed later on in the report. It is not clear why they couldn't be used as a source for long term prediction of trends, despite uncertainties.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Check and Resolve**
The explanation can be found in the paragraph:

"Other studies have found that trends from a single flood event may be opposite of the long-term trend and therefore these results should not be used for estimating long-term aggradation/degradation trends."

This is a summary of the following. NHC conducted HEC-6T sediment modelling for the Sac Bank project that included long-term hydrology (1997 - 2008)from actual gage data as well as only specific events (e.g. 1/50 ACE, 1/100 ACE). A comparison of the results for the same reach (Lower American River to Freeport) shows that the reach is degradational during a specific event but aggradational over the long-term. The implication is that using single event hydrology (e.g. the 1/100 ACE event) or a series of single event hydrology (e.g. 1/100 ACE event followed by a 1/200 ACE event) may provide evidence for the opposite trend (degradation) than if a wider range of flows (e.g. 1997 - 2008 "continuous" hydrology) is used for the same reach. So while specific event modeling is likely more conservative for design and cost of erosion counter-measures for this reach, it may not be helpful if long-term trends are needed for other purposes, such as for determining if future sedimentation will bury spawning gravel. Despite this limitation, the results do represent the latest geologic understanding and may still be informative and perhaps conservative relative to feasibility level designs and costs. There is a lot of uncertainty associated with all sediment models as noted in the comment. However, the Sac Bank Sediment Study shows that using event specific hydrology vs. long-term hydrology for the exact same model can lead the model to show opposite trends. Therefore the relative differences may lead to incorrect conclusions even though both models are subject to considerable inaccurracies.

If necessary, this longer explanation can be provided. However, I feel it disrupts the flow of the document and does not contribute significantly to the overall conclusions.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Open Comment**
This is good discussion and would be appropriate to add as a footnote so it doesn't disrupte the flow of the document.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

2-0 Evaluation **Concurred**
Text was revised to add the discussion. This new proposed text is:

"The calibrated model was run for multiple synthetic hydrologic scenarios designed to mimic short-term and long-term morphological conditions. This does not include a full set of hydrographs over decades of future conditions but uses a series of individual events to approximate short-term and long-term conditions. This hydrologic approach to the sediment modeling is useful for relative comparison purposes and should not be used to estimate actual future conditions. Other studies have found that trends from a single flood event may be opposite of the long-term trend and therefore these results should not be used for estimating long-term aggradation/degradation trends.

NHC conducted HEC-6T sediment modeling for the Sacramento and Lower American rivers (NHC 2012) that included long-term hydrology (1997 - 2008)from actual gage data as well as only specific events (e.g. 1/50 ACE, 1/100 ACE). A comparison of the results for the same reach (Sacramento River from the Lower American River confluence to Freeport) shows that the reach is degradational during a specific flood event but aggradational over the long-term. The implication is that using single event hydrology (e.g. the 1/100 ACE event) or a series of single event hydrology (e.g. 1/100 ACE event followed by a 1/200 ACE event) may provide evidence for the opposite trend (degradation) than if a wider range of flows (e.g. 1997 - 2008 "continuous" hydrology) is used for the same reach. So while specific event modeling is likely more conservative for design and cost of erosion counter-measures for this reach, it may not be helpful if long-term trends are needed for other purposes, such as for determining if future sedimentation will bury spawning gravel.

Despite this limitation, the results do represent the latest geologic understanding and may still be informative and perhaps conservative relative to feasibility level designs and costs. There is a lot of uncertainty associated with all sediment models as noted in the comment. However, the Sac Bank Sediment Study shows that using event specific hydrology vs. long-term hydrology for the exact same model can lead the model to show opposite trends. Therefore the relative differences may lead to incorrect conclusions even though both models are subject to considerable inaccurracies.

The results from this study (NHC 2013) include:...."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 07 2014

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503658 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 1.7.2.6, paragraph 2. There should be more detail in terms of what was done and what wasn't done to address each of the conclusions and recommendations from the various panels including the why and the why not. While geotechnical, geologic, and geomorphic studies were referenced in Section 1.8, follow-on hydraulic and sedimentation studies were not. It would be good to draw a clear connection from the recommendation to the actual follow-on work or study. It would be especially important to note recommendations that were not addressed in some fashion and the reasoning for not doing so. While budget and schedule are important, there should also be some technical reasoning perhaps from a risk standpoint that played into it.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Check and Resolve**

For the most part most of the items mentioned have been followed through with the exceptions noted below. The exceptions noted have been added to the text as follows in the parentheses. These include the following 2 bulleted items:

• Existing modern bank protection sites need to be analyzed to assure they can withstand a flow of 160,000 cfs. (Note: This recommendation has not been followed to date. The feasibility study assumes that recent erosion protection was designed and constructed adequately to withstand this discharge without the need for additional analysis beyond what was conducted for the design. It has not been verified that each site was designed for 160,000 cfs.)

• Because of the large extent of bankline/levee requiring armoring, a site prioritization method needs to be developed so that the sites being the most urgent will be addressed first when construction begins. (Note: This recommendation to develop this site prioritization method has not been completed at this time and will need to be developed in the future.)

In addition, language has been added at the end to highlight that some of the recommendations mentioned that were followed through are provided in parentheses:

"Some of the recommendations were not addressed due to budget and schedule considerations. Some of these recommendations that were not completed are noted above in parentheses. The District envisions that, as appropriate, the remaining work efforts will be addressed in future studies."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Open Comment**

The 2nd to last bullet in 1.7.2.2, for note in () change to "The mehtod was not considered practical for use in the stability study and was not conducted". You probably should consult with Mike K, to make sure that is correct.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

2-0 Evaluation **Concurred**

I am checking with Mike now. I have modified the language as indicated:

"• Characterization of materials is primarily being completed by the EFA and JET testing. Other methods to characterize engineering properties of geologic materials should be utilized. An example of one would be the NRCS soil/rock erosion model. Additionally, lab test results needs to be correlated to behavior in the field. (Status: The method was not considered practical for use in the stability study and therefore was not conducted)"

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 07 2014

2-1 Backcheck Recommendation **Open Comment**

I am ok with the proposed modified language pending review by Mike.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

3-0 Evaluation **Concurred**

Confirmed that Mike is OK with the proposed language.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 10 2014

3-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 10 2014

Current Comment Status: **Comment Closed**

5503660 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 1.8.4, paragraph 3. Results were to identify locations requiring further study and investigation. Are those areas identified in this report? This should be addressed in some manner so it doesn't leave it as a question.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Check and Resolve**

The study referenced in the comment was developed as a standalone document that described the surficial geology to varying levels of detail dependent on the location within the general study area. This mapping was developed using the best existing data. Where the quality of the data was improved it was incorporated into the study, but also highlighted where data gaps still existed. At one point additional investigation contracts were in process but that study was differed to PED. The erosion attachment assumes a certain level of detail in the data and resulting conclusions which comprised the study and admittedly assumes more detailed required for PED and construction. I believe several parts of the report address the idea of further study during PED, but a specific account of where further study is needed would essentially be a description of the PED scope which is likely too detailed and comprehensive for this report.

Submitted By: Michael Kynett (916 557 7898) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503661 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 3.1, paragraph 7. The report in general seems to be saying erosion of the hard outcrops is not an issue, though it does state here several mechanisms of how they erode. Time scale likely is a key consideration in terms of how long it takes for these processes to occur and should be discussed briefly here.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Check and Resolve**
The geotechnical and geologic study did vastly improve the knowledge of the properties and location of what was originally thought to be an erosionally resistant clay layer. The study referenced in the comment did find that due to the location and properties of the material, the risk posed to the flood control structure due to erosion of the so called ERU was likely low. Based on the new understanding of the material, it also proposed general failure mechanism of the ERU. However, those mechanisms were not studied. Any inference of the time required for the ERU to undergo its likely erosion process would require substantial additional data collection and analyses, based on the previous conclusion regarding consequence of failure of the ERU, that study would not be relevant to the flood control structure.

Submitted By: Michael Kynett (916 557 7898) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Open Comment**
Please add this explanation as a footnote in the document.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

2-0 Evaluation **Concurred**
Added the following explanation to section 7.1.2 in coordination with Mike (copied and pasted from Mike as he suggested):

" Field observations suggested that erosion of the exposed erosionally resistant sediment occurs over time at both the granular- and outcrop-scale. However, the mechanisms and time scale associated with that erosion are not well understood and were not studied. Due to the location and properties of the material, the risk posed to the flood control structure from erosion of the erosion resistant sediment were estimated to be low and no further study of its erosion mechanisms or time scale were performed."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 10 2014

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 10 2014
Current Comment Status: **Comment Closed**

5503663 Hydraulics n/a n/a n/a
Comment Classification: **For Official Use Only (FOUO)**

Section 3.2, paragraph 4. Along with describing the various stratigraphic features, the relative erodibility of these units should be discussed and how this information was used in the overall study.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
The subject section of the report gave a general summary of the process used to develop the layers of the model. These layers were developed by grouping material based on similar properties, which included erodibility as well as several other properties. This is described in as much detail as is relevant for this report in paragraph 3 of Section 3.2. As much of the erosion rate testing was in progress and also not nearly comprehensive enough to assign to each layer, the relative erodibility is evident by the material types and their mechanical properties described in the report.

Submitted By: Michael Kynett (916 557 7898) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Section 4.2 discusses the erodibility of materials lining the American River channel considering predicted velocities and shear stresses. This is an important link, that answers the comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503666 Hydraulics n/a n/a n/a
Comment Classification: **For Official Use Only (FOUO)**

Section 3.2, paragraph 5. Not sure Bouldery and cobbley are official terms. Please confirm.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Confirmed

Submitted By: Michael Kynett (916 557 7898) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503668 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 4.1, paragraph 1. The Folsom mini-raise should be referred to as 3.5 ft raise. This should be corrected throughout report.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Will do.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503671 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 4.1, paragraph 1. Indicates it will be able to discharge 160k, but isn't that part of what the study is trying to figure out or justify? The reality is the JFP and Dam Raise projects, based on the 2007 PACR simply assumed downstream capacity was 160k without recognizing the current downstream limitations.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Concur, text has been revised to describe the "intent" of this what the project will accomplish not necessarily providing a technical opinion.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

2-0 Evaluation **For Information Only**

The GRR is not a design level document but is primarily concerned with conservatively estimating project costs, benefits, and environmental impacts. Additional analysis will need to occur during implementation to verify the assumption that existing rock (either mdoern revetment or cobblestones) are designed for 160,000 cfs. If the rock is designed and constructed in accordance with standard engineering practice and USACE guidelines, it should reasonably be expected to provide adequate erosion protection. However, continued maintenance is needed and may include installing additional bank protection as necessary. In addition, the bank protection needs to be monitored during and after flood events. Duration is not necessarily part of the riprap design criteria. However, this should be considered during design of the riprap along with the consequences when selecting an appropriate factor of safety. Site selection and prioritization will also need to occur during implementation.This information should be included in the cost schedule risk analysis and the risk register. Additional languag was added to address this in sections 4 and 7.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 10 2014

2-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 10 2014

Current Comment Status: **Comment Closed**

5503673 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Table 4-1. These values were derived for the Common Features Study, but may have changed, specifically as part of the Water Control Manual update. This caveat should be added here in the text.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**

Concur, caveat has been added to text.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

Current Comment Status: **Comment Closed**

5503675 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 4.1, paragraph 4. Flow duration was identified as a source of uncertainty and could certainly be critical with the potential for large flows at longer durations under the new operation scenarios. How was this captured in the risk informed decision making, i.e. development of fragility curves?

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**

In developing the levee performance curves the best available data was used, including flood hydrographs which gave flow and duration information. This information was used in the estimation of the levee performance for each loading shown in the judgment curve. Of course, with increasing stage came increased loading on the levee (velocity and shear stress) as well as increased duration for which erosion flows would be seen on the levee slope.

Submitted By: Michael Kynett (916 557 7898) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5503676 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.1, paragraph 5. It notes that "this information with estimated relative sea level rise and other pertinent information should be used to inform risk based decisions". Which risk based decisions is it to inform? The feasibility study?

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **For Information Only**

This can be used to inform feasibility level or design level risk based decision. For example, if scour counter-measures represent a significant component to the feasibility cost, adding the cost in would be conservative and may reduce risk by improving assurance that critical bridges used for evacuations are passable. It can also be used for design based decisions such as computing scour depths for design of erosion protection.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Open Comment**

Comment response also indicates can be useful for design purposes, if true, indicate that as well at the end of paragraph 5.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

2-0 Evaluation **Concurred**
Added additional sentence at the end so that it reads:

"This information together with estimated relative sea level rise and other pertinent information should be used to inform risk based decisions. This includes both feasibility and design level decisions."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 07 2014

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503678 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.1, paragraph 6. Please be more explicit on describing "model differences".

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
This section has been revised for clarity and to call out the differences explicitly as indicated below (differences are now bulletted):

"The future trend noted in Figure 5 5 does not include more recent data on erosion resistance formation beneath the American River that could limit future vertical erosion. A more recent update of the model includes this new geotechnical information and draft results are shown below in Figure 5 9. The model used in figure 5-9 includes the updated geotechnical information but has other differences with the model used in Figure 5 5. The significant differences between the models used for Figure 5 5 and Figure 5 9 are:

• Figure 5 9 model includes the updated geotechnical information while Figure 5 5 model does not

• Figure 5 9 model is based on synthetic event hydrology while Figure 5-5 model is based on actual historical hydrology
• Figure 5 9 model is "fixed" at the downstream boundary by a rating curve while the Figure 5 5 model is allowed to adjust dynamically based on changes to the Sacramento River (i.e. Figure 5 9 is not "linked" to the Sacramento River HEC-6T model while Figure 5 5 is).

Therefore Figure 5 9 cannot be compared directly with Figure 5 5. The amount of scour seems to be much less than previously predicted which may be partially explained by model differences noted above. Despite these differences, by referencing Table 5 1 which lists the average expected channel erosion by reach for the Lower American

River for 50 to 100 years of simulation, it can be concluded that it is possible the channel may erode nearly fully to the erosion resistant material between RM 6.5 and 10 (as shown in Figure 5 9). It is also possible that the bed may erode to or nearly to the erosion resistant surface for portions of the reach above RM 15 (above where the current federal levees end). Especially since the depth of active erosion likely exceeds that observed or predicted by the models. This makes protecting the levee toe critical for flood risk reduction and future degradation upstream of the levees may have detrimental impacts on environmental and recreational interests in this reach."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503680 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.1, paragraph 6. The non-continuous hydrographs were expected to represent the main opportunities for scour/aggradation. Please explain.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Check and Resolve**
The non-contious hydrograph may show the main opportunities for scour/aggradation. However, it appears that the model may not be entirely representative of actual conditions because the downstream end is "fixed" by the downstream rating curve rather than being dynamically linked to the Sacramento River HEC-6T model. This "fixed" boundary may propogate upstream and affect the final solution. In addition, as indicated in another comment and in the report (section 5.1, paragraph 5), using individual events may be conservative for a design and feasibility cost perspective as it is likely to show more scour than long-term hydrology. This is likely OK for the feasibility study but the results should not be used to portray long-term trends for environmental considerations. Only for representing flood events.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503683 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.1.1, paragraph 1. Please define "lower half of the study reach" more explicitly.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Revised language to clarify:

For the Sacramento River, simulated degradation or aggradation generally increase from 1 to 5 ft, with a prevailing aggrading trend in the lower half of the study reach (less than 1 ft in the lower portion – which is the lower ½ of the reach from Colusa to Freeport).

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

Current Comment Status: **Comment Closed**

5503686 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.1.1, paragraph 2. Explain the basis for decreasing other flows so total annual runoff does not change. Why does the total annual runoff remain the same?

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **For Information Only**
For climate change, predicting whether this area will become wetter or drier is not simple. Based on conversations with hydrologists, the overall annaul rainfall over the long-term may not change significantly. Given the uncertainty involved, assuming that the overall amount of rainfall remains unchanged is reasonable for a sensitivity analysis. However, climate change is often thought by experts to exagerate heavy precipitation and exagerate low rainfall. Therefore by increasing some of the highest flows and decreasing some of the lowest flows is expected to be a reasonable assumption for modeling the sensitivity of the sediment model to climate change. It is not expected that it is modeling climate change exactly, but is modeling one of an infinite number of possibilities to get a sense for the model sensetivity to climate change.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5503687 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.1.1, paragraph 3. Hydrology developed for the HEC-6T for the American River was supposed to represent future operating conditions with Folsom projects in place and so that should be noted. However, with that said, there certainly will still be uncertainty in future hydrologic conditions as noted.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Added a clarifying sentence:

"The HEC-6T model developed by the ARCF GRR (e.g. Figure 5 9) used hydrology that is thought to be representative of changes to operations at Folsom Dam."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

5503688 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.1.1, paragraph 4. Please note source of HEC-6T results – I assume they come from the latest NHC modeling, but wasn't sure.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Added language clarifying the results are from the HEC-6T model developed for the Sac Bank project:

"In general, however, degradation predicted by the model for the lower American River (the HEC-6T model developed for the Sac Bank Project, see Figure 5 5) agrees with the stage-discharge records obtained for the American River gage at Fair Oaks which shows ongoing channel degradation."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014

1-2 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503690 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.1.2. If studies during PED yield results showing the need for grade control, how will this be taken under consideration seeing that the decision now is not to include it as part of the plan and only as OMRR&R? This could create a difficult situation down the road with the need to include, but without authorization to do so. Later in the document (Section 5.2.4), it indicates consequences with including in the plan are greater than not including. This should be explained further.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Check and Resolve**
If grade control is needed in the future but not included as part of this feasiblity study originally, it is assumed the appropriate USACE planning and/or permitting process and necessary Congressional action will need to be followed. For example, perhaps a LRR and a new EIS/EA will be needed and new authorization may be needed. See planning for more detailed explanation.

The explanation for why not including grade control is the lower risk feature is currently explained. In summary the thought is that:

1) It is inconclusive if grade control will be needed (even by experts) and whether it is needed or not is well witin the uncertainty of any technological tools used to analyze the situation.
2) The need for grade control is likely to occur oover a longer period of time that can be monitored and remedial actions put in place and not during a single flood event. This "ductile" failure mode lowers the risk (similar to a ductile failure that can be observed in advance of failure and fixed in a structure lowers the risk more than having brittle failure that occurs suddenly without warning).
3) By including grade control, it guarentees financial expenditure likely on the order of $50 million) and associated detrimintal environmental impacts to address a percieved need when the need is debatable.

A monitoring approach will allow for determining if the need develops and take appropriate action in a timely manner only if needed and is considered lower risk than spending $50 million dollars and impacting the environment on something that likely is not needed.

Please advise on what if anyting needs to be added to explain further.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Open Comment**
The revised discussion is good. Only change - in first paragraph spell out OMRRR and in second paragraph use abbreviation only.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

2-0 Evaluation **Concurred**
Agreed and completed as suggested so the OMRRR is spelled out in 1st paragraph and abbreviated subsequently.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 07 2014

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503692 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.2.1, paragraph 5. Please define "Common Feature GRR project vicinity".

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Modified sentence to clarify that only the Sacramento River within the ARCF GRR project is included in this statement:

"Therefore the Channel Evolution Model indicates lateral erosion and channel widening for both the Lower American River and Sacramento River within the Common Features GRR project."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503694 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.2.3, paragraph 1. It notes work conducted along selected reaches. I assume that includes the American River. If so, please add, "including the American River".

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Added:

"The work was conducted along 300 miles (483 km) of Sacramento River main stem and selected reaches, including the Lower American River."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503697 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.2.3. Only a few of the sites are within the study area and the basis for selection is not apparent. Some additional discussion would be helpful.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Check and Resolve**
The basis for selection of the sites can be determined by reading the original USDA report for the Sacramento River Bank Protection Project. This is referenced and the reader can look here for how the Sacramento River Bank Protection Study set up this study and why they selected the sites. This is intended to be a summary document and not provide all the details, only the pertinent information (e.g. focus on the conclusions with references to other documents for more details). Paragraph 4 notes that the number of sites and location of the sites is not ideal for the ARCF study but still provides valuable insights to overall erosion trends for the study area and is in agreement with other findings:

"Of the 50 intensive sites analyzed, seven are within the Common Features GRR study area along the Sacramento River and three are located in the Common Features GRR study area along the Lower American River. While this may be appropriate for large scale studies like the Sacramento River Bank Protection Project, it is likely not a large enough sample for more narrowly focused feasibility studies such as the Common Features GRR. Also, no sites were located in the area constricted by levees between RM 5 and 10 on the Lower American River. In addition, the hydrology used for estimating erosion 48 years into the future generally had higher flow rates than long-term averages and therefore may over predict long-term sediment loading and bank retreat. However, the study still provides valuable insight into erosion in the Common Features GRR project. The estimated percent of total sediment derived from the banks agrees remarkably well with the results from a historic channel shift analysis (NHC 2012). This study by the USDA confirms the results of the Channel Evolution Model and the observations from annual erosion surveys and air photo analysis."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503698 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.2.4, paragraph 3. Work required to protect infrastructure is not currently in the plan but no reasoning is provided for not including it, especially since it has been identified as a potential issue.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Added additional language:

"For both the Lower American River and the Sacramento River, infrastructure encroaching in the floodway, such as bridges and pipelines, need to be adequately protected from reasonably anticipated scour during design and construction. This effort is not included in the tentatively selected plan. It is assumed this effort will occur during future analysis and design efforts and likely needs to be coordinated with multiple agencies and infrastructure owners. Civil Design has also determined that the additional cost of the scour and erosion counter measures for the infrastructure is not significant compared to the overall cost of the erosion protection currently included in the tentatively selected plan and is well within the associated cost contingency.:

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503702 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.3.1, paragraph 2. Please confirm results of wind-wave analysis by NHC. 46 miles of levees at high risk seems high. Is that high risk from failure due to wind-wave action or high risk of erosion happening? This should be briefly discussed.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Check and Resolve**
Section 5.3.1, paragraph 1 states:

"Each site was assigned the highest risk computed for the site for either levee face erosion or overtopping for any wind direction at the site."

Therefore the high risk is from wave erosion or overtopping from waves for any wind direction.

Please see original report on wind-wave for additional information as this is only reporting the values in this original report on the wind-wave analysis and a determination on whether the values are apporpriate or not can only be made during a technical review of the wind-wave analysis. This is beyond the intent of this summary document.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503703 Hydraulics n/a n/a n/a
Comment Classification: **For Official Use Only (FOUO)**

Section 5.3.1, paragraph 2. It is not clear if high risk areas are included in the current plan of the GRR. Also there may be overlap with what was included in the Natomas PAC.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Text has been revised to better describe the risk.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Open Comment**
Change the last sentence of paragraph 2 of 5.3.1 to read, "The study included reaches that are part of the Natomas PAC".

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

2-0 Evaluation **Concurred**
Agreed and completed as suggested.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 07 2014

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503706 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.3.3, paragraph 1. I would not think that relying upon the waiver process for ETL 1110-2-1571 would be a reasonable approach in the feasibility study. This may be a planning question.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Concur, this is a high risk. However, the feasibilility study believes they have concurrence on this path from higher level reviews and policy makers.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503708 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.3.3. Further work is to happen during the refinement of the tentatively selected plan – when would that happen, is there really time for that? Comment also applies to Section 5.3.5 on scour analysis.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Text has been revised. This work will likely be done during PED.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Open Comment**
Strike, "of the study" at the end of section 5.3.3.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

2-0 Evaluation **Concurred**
Agreed and completed as suggested.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 07 2014

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503710 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.4.1, paragraph 1. To my knowledge, levee performance curves were developed prior to gathering of additional geotechnical, geophysical, geomorphic data and further HEC-6T modeling. What, if anything, has been done to validate previous levee failure curves with new information? In addition, duration of flows have been identified as a key component in potential of erosion and has not been accounted for.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
The levee performance curves were developed in 2011 as required by the contemporary schedule. The judgment curves (erosion as a component) were developed using an expert elicitation in June 2009, as is the case for all the ARCF GRR judgment curves. The validity of erosion component of the performance curves was brought up at the expert panel meetings and at PDT meetings. It was found that the estimated levee performance captured by the curves was reasonable based on the available data and expertise. In consultation with PM and the PDT the decision was made to not pursue developing more rigorous analytical methods to refine the erosion portion of the curve.

Submitted By: Michael Kynett (916 557 7898) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Open Comment**
The response to comment is an important point of discussion and should be included in the documentation somewhere under Section 5.4.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

2-0 Evaluation **Concurred**
Added the following as a new paragraph after the 2nd paragraph of section 5.4.1 on page 58 in coordination with Mike (copied and pasted paragraph Mike edited that contains Mikes edits):

"The levee performance curves were finalized in 2011 with the judgment curves (erosion as a component) that were developed using an expert elicitation in June 2009. The validity of the erosion component of the performance curves was discussed at the expert panel and project team meetings. It was found that the estimated levee performance captured by the curves was reasonable based on the available data and

expertise. In consultation with the project team the decision was made not to develop more rigorous analytical methods to refine the erosion portion of the curve."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 10 2014

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 10 2014
Current Comment Status: **Comment Closed**

5503713 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.4.1, paragraph 2. The fragility curves should show or it should otherwise be stated that the major component of the residual risk is erosion.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
This comment should be addressed by the document editor, the levee performance curves were included in the report by the editor and I too commented on the need to break out the component curves or only show the judgment curve and its components.

Submitted By: Michael Kynett (916 557 7898) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503714 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 5.4.2, paragraph 2. Please reference the appropriate NHC study discussed here.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Added refernce to NHC 2012:

"The results of this effort by NHC (NHC 2012) are shown in Table 5 2 for the portion of the Sacramento River in the ARCF project footprint."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503715 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 6.1, paragraph 2. Please be more specific on "future studies". Design during PED?

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **For Information Only**
Originally, we used the terminology "during PED Studies". However, we were instructed, by Graff, to change the terminology to "future studies" since the project is already in PED.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014
Current Comment Status: **Comment Closed**

5503716 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 6.2, paragraph 4. It is hard to follow what is being said here. Please clarify.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Removed last sentence. Basically it's saying that the design cross section (geometry) yielded sufficient rock for launching (so it should be conservative). The cross section also yielded enough environmental mitigation features to offset requirements (so no additional mitigation required).

Submitted By: Thomas Goebel (916-557-7175) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503718 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Table 6-1. No information is provided on the assumed rock size. As discussed with the civil designers, rock sizing and gradation were preliminary estimates mainly for purposes of cost estimates. No further detailed design has taken place. This should be noted as part of Section 6.2, paragraph 3.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**

Added the following text to section 6.2:

Rock gradations were deemed less important for determining costs for this design level. The geometry of the design yielded sufficient volumes of rock to meet anticipated launchable rock requirements and sufficient mitigation features to offset environmental impacts. The launchable rock volume requirements were determined based on average velocities for above-mentioned typical sections. Site-specific design for erosion protection sites will occur in PED.

Submitted By: Thomas Goebel (916-557-7175) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

Current Comment Status: **Comment Closed**

5503719 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 6.4, paragraph 2. It references Figure 6.3, noting no erosion protection features along the left levee of the Sac River north of the American. The figure only shows a small portion of that levee upstream of the American and so really doesn't illustrate no erosion fixes in that reach.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**

The text will be modified to:
"Figure 6-3 depict s the footprints of the proposed erosion protection for both the Lower American and Sacramento Rivers. There are no proposed erosion protection features located along the left levee of the Sacramento River upstream of the American River confluence. The..."

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Open Comment**
The frist sentence of 6.4 is repeated twice. Later on in 6.4, "PED" should be changed to "site specific design".

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

2-0 Evaluation **Concurred**
Changed as requested.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 07 2014

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503720 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Table 6-2. I was under the impression all un-reveted locations would receive treatment. What ultimately was the basis for including or not including protection? This needs to be clearly discussed.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Added to end of section 6.4 (after last paragraph):

A channel stability analysis (Ayres Associates, 2010) was used to determine areas requiring revetment with the assumption that all areas without modern bank protection will be protected. Modern protection was determined by areas defined as rock riprap with overall condition of good or very good. Additionally, there are some areas of high ground and areas with significant existing berm where protection is not required as shown in Figure 6.3.

Submitted By: Thomas Goebel (916-557-7175) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Open Comment**
The Ayres report did not by itself recommend bank protection at all areas without modern bank protection. My understanding was other information was used, such as the 2004 Ayres report that looked at velocities and shear stresses for flows up to 160k. Newer studies should also be referenced to help support the conclusions reached, assuming this can be done.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

2-0 Evaluation **Concurred**

We have discussed this issue with James Elsberry to get a better understanding of how Civil Design selected the locations of where bank protection was proposed and not proposed. H&H probably should have had a more involved role in the process. Nonetheless, the text of Section 6.4 will be modified as follows:

"6.4 Erosion Protection Footprints

Along the American River, the rationale used to determine where bank protection was required for the feasibility study involved consideration of several factors. The most important factors included: 1) the velocity computed by Ayres' 2-dimensional hydraulic modeling (Ayres 2004) for a discharge of 160,000 cfs, 2) the erodibility of the material near the levee prism, and 3) the past performance of the levee segment with respect to erosion. Figure 6-3 depicts the footprints of the proposed erosion protection for both the Lower American and Sacramento Rivers.

Using the above criteria, bank protection was determined to not be required along two segments of the right bank of the American River. The upstream segment, extending between the upstream end of the levee (~RM 14.4) and RM 10.4 and the downstream segment extending between a point near Cal Expo (RM 5.5) and the confluence with the Sacramento River (RM 0). In addition to following the above criteria, a portion of the upstream segment contains a 4000 foot-long reach wherein the channel includes a wide right overbank consisting of high ground (i.e., the location of a sewage treatment plant) in which the water surface elevation for a discharge of 160,000 cfs does not get near the levee and the levee essentially exists as a "freeboard" levee."

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 10 2014

2-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 10 2014

Current Comment Status: **Comment Closed**

5503722 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 7.1.2, paragraph 4. This is critical information and should be emphasized in the 3D stratigraphic discussion of the various layers.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Check and Resolve**

Section 3.2 of the report includes a detailed description of the geotechnical characteristics of the post-1850 alluvium as well as sample figures which show the location of the unit. As this unit was identified by engineering and geologic interpretation, few exploratory borings were drilled where this unit is present. These materials are the result of hydraulic mining erosion of soil and alluvium in the Sierra

Nevada and downstream deposition of this eroded material within the American River channel. The purpose of the 3-d model was not to make a judgment on the performance of the system but to graphically show the subsurface. Therefore the interference on the performance of this layer is correct in Section 7.1.2 but was appropriately not included in section 3.2.

Submitted By: Michael Kynett (916 557 7898) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503723 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 7.1.3, paragraph 1. Recognizing the issue of erosion on the American River, they likely would operate differently. To make it fully functional and to realize the flood damage reduction benefits intended for the project, the erosion work is needed. Some additional discussion should be provided.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
The subject paragraph has been modified to:

"Once the JFP auxiliary spillway is constructed and functioning, new operations criteria are planned which would result in larger flood flows being conveyed through the American River with greater frequency compared to past conditions. These higher flood flows would exert additional pressure on the banklines and levees resulting in greater erosion, sediment transport, and potentially changes to the planform of the low-flow channel. Nonetheless, it is important to note that without inclusion of the proposed erosion protection features; the flood damage reduction benefits intended for the project cannot be fully realized since the lower American River channel will not be able to safely convey the new larger discharges."

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Open Comment**
Add to the end of paragraph 1 of 7.1.3, "and flow restrictions from Folsom would likely be put in place.".

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

2-0 Evaluation **Concurred**
Agreed and comleted as suggested.

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 07 2014

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503726 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 7.1.4, paragraph 2. It indicates un-revetted portions are at risk, but what about revetted portions without modern bank protection? Though the statement indicates un-revetted portions should be protected, not all un-revetted locations are being recommended for fixes.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Changed to read "most un-revetted portions of the ...."

Submitted By: Thomas Goebel (916-557-7175) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Open Comment**
In paragraphs 2 of 7.1.4, instead of referencing "un-revetted" portions as needing protection, it really should be saying portions without modern bank protection.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

2-0 Evaluation **Concurred**
1) A basic assumption of the feasibility study was that all of the historic revetment sites (i.e., cobble sites) would be replaced with modern bank protection. Therefore, there are no revetted portions without modern bank protection in the current plan.

2) The text has been modified to replace the terminology of "un-revetted portions" with "portions without modern bank protection" as follows:

"The available information indicates that many of the levee segments without modern bank protection are at risk of erosion related failures along the Sacramento River and Lower American River in the Common Features project study area. The levees therefore need to be protected..."

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 10 2014

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 10 2014
Current Comment Status: **Comment Closed**

5503727 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 7.2. Some discussion should be added about how additional study would help prioritize the erosion work, noting that because of all the extensive work needed it would likely not take place all at once, but over a number of years.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Text has been added to include this additional task.

Submitted By: Jesse Schlunegger (916-557-6777) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Open Comment**
The text was added to the end of 7.3, and I think really should be added to the end of paragraph 4 of 7.2. The important point to make is one of the purposes of the need for additional study is to prioritize sites.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014

2-0 Evaluation **Concurred**
The last sentence of paragraph 4 of 7.2 was modified as follows (section 7.3 is not modified):

"These sites must be assessed in future studies to confirm that these sites are stable, prevent erosion for discharges up to and including 160,000 cfs, and to prioritize sites to be constructed over a period of years."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 07 2014

2-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503728 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 7.2, paragraph 3. It indicates that there is a need for bed protection to be assessed during final design, but this isn't consistent with what is stated Section 5.1.2.

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Added clarifying language in section 5.1.2:

"Grade control is not anticipated to be necessary but the need for this should be monitored as part of routine operation of the constructed project."

To be consistent clear and , the language in section 5.1.2 was changed from:

"The need for bed protection at key locations will need to be assessed and included, as required, in the final design during the future studies."

To this:

"The need for bed protection at key locations will need to be monitored in the future as part of operating the project."

Submitted By: Todd Rivas (916-557-7523) Submitted On: Feb 06 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503729 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Section 7.2, paragraph 4. Please reference repair sites being discussed for assessment in future studies – modern or cobble sites or both?

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**
Added to end of section 6.4 (after last paragraph):

"A channel stability analysis (Ayres Associates, 2010) was used to determine areas requiring revetment with the assumption that all areas without modern bank protection will be protected. Modern protection was determined by areas defined as rock riprap with overall condition of good or very good. Additionally, there are some areas of high ground and areas with significant existing berm where protection is not required as shown in Figure 6.3."

Sites shown in figure 6-3 and described in section 7.2 are modern bank protection sites.

Submitted By: Thomas Goebel (916-557-7175) Submitted On: Feb 05 2014

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 07 2014
Current Comment Status: **Comment Closed**

5503734 Hydraulics n/a n/a n/a

Comment Classification: **For Official Use Only (FOUO)**

Additional editorial comments – See attached document.

(Attachment: Erosion_Attachment_01232014_SS.docx)

Submitted By: Ethan Thompson (916-557-7142). Submitted On: Jan 29 2014

1-0 Evaluation **Concurred**

Thanks. The report has included almost all of the recommended modifications.

Submitted By: Scott Stonestreet ((916) 557-7719) Submitted On: Feb 04 2014

1-1 Backcheck Recommendation **Close Comment**

Closed without comment.

Submitted By: Ethan Thompson (916-557-7142) Submitted On: Feb 06 2014

Current Comment Status: **Comment Closed**

QUALITY CONTROL CERTIFICATE
Real Estate Division, Acquisition and Management Branch

PROJECT NAME: AMERICAN RIVER COMMON FEATURES GRR
PRODUCT: REAL ESTATE APPENDIX FOR FRM MILESTONE
ACTUAL COMPLETION DATE: August 3, 2015

PROJECT MANAGER: DAN TIBBITTS

The Real Estate Appendix is intended to inform the reader of the major Real Estate factors which were considered in the investigation and influenced decisions documented in the main report. It also presents a summary of the real estate costs, inventory, and analysis and assumptions associated with the lands, easements, right of way, relocations and disposal required for the tentatively selected plan. This DQC effort has verified that the Real Estate analysis is compliant with clearly established U.S Army Corps of Engineers policies, regulations, and that the assumptions, methods, data and tools used are appropriate for purposes of a real estate plan and that the level of detail and scope are reasonable and consistent within the context of the Real Estate Appendix.

REAL ESTATE LEAD
I have ensured that the above products were prepared in accordance with standard quality control practices. I have also incorporated or resolved issues identified during District Quality Control (DQC) Review.

Lead Realty Specialist Name	Title: Realty Specialist	
Laurie Parker	Laurie Parker	8/10/2015
Print Name	Signature	Date

REVIEWER
I have reviewed the products noted above and find them to be in accordance with project requirements, standards of the profession, and USACE policies and standards.

DQC Reviewer: Name	Title: Chief, Civil Works Section	
Paul Zianno	Paul Zianno	8/7/2015
Print Name	Signature	Date

QUALITY CONTROL CERTIFICATE
Real Estate Division, Acquisition and Management Branch

PROJECT NAME: AMERICAN RIVER COMMON FEATURES GRR
PRODUCT: REAL ESTATE APPENDIX FOR PUBLIC REVIEW MILESTONE
ACTUAL COMPLETION DATE: FEBRUARY 2015

PROJECT MANAGER: DAN TIBBITTS

The Real Estate Appendix is intended to inform the reader of the major Real Estate factors which were considered in the investigation and influenced decisions documented in the main report. It also presents a summary of the real estate costs, inventory, and analysis and assumptions associated with the lands, easements, right of way, relocations and disposal required for the tentatively selected plan. This DQC effort has verified that the Real Estate analysis is compliant with clearly established U.S Army Corps of Engineers policies, regulations, and that the assumptions, methods, data and tools used are appropriate for purposes of a real estate plan and that the level of detail and scope are reasonable and consistent within the context of the Real Estate Appendix.

REAL ESTATE LEAD
I have ensured that the above products were prepared in accordance with standard quality control practices. I have also incorporated or resolved issues identified during District Quality Control (DQC) Review.

Lead Realty Specialist Name	Title: Realty Specialist	
Laurie Parker	Laurie Parker	2/19/2015
Print Name	Signature	Date

REVIEWER
I have reviewed the products noted above and find them to be in accordance with project requirements, standards of the profession, and USACE policies and standards.

DQC Reviewer: Name	Title: Chief, Civil Works Section	
Paul Zianno		2/24/2015
Print Name	Signature	Date

Common Features Real Estate Plan February 2015
DQC Comments
Reviewer: Paul Zianno, Chief, Civil Works Section

REPORT SYNOPSIS

DQC COMMENT	RESPONSE	BACK CHECK
Based on previous comments from HQ, make sure the maps are attached to the RE Plan and not on a DVD. You can send the DVD, just make sure the maps are attached to the REP. Page 4	Will include hyperlink in the document in lieu of a DVD. The reviewer can click on the link and the data will come up instantly	X
Please identify what the letters mean on the map. Need to identify as phases. Page 9	Concur	X
After reading through this section it needs to be rewritten describe in specific detail with the description of the estates required. List all of the estates required for this project and under each one describe the location, acreage, owner description (private or non-federal), tract #. Need to break out by Title of the Sacramento and American River Systems Mitigation discussion can be at the end of this section. Laurie, Please identify what the letters mean on the map. Need to identify as phases. Page 12	Concur -- rewriting section as stated above	X
Is this a Road Easement? Page 12	Yes it is a Road Easement	X
This is a non-standard estate? Page 12	No the mitigation is at a bank or on site. It could potentially become non standard if fee is not available on site.	X
This is also a non-standard estate? Page 12	Due to the SWIF variance this is no longer a requirement of the project and these section will be removed from the report	X
You need to include specifically and spell out each estates required for the project. Also, include the acreage, tract numbers and the number of and type owners impacted by this acquisition. Adding a Table showing all the estates with the required information might be beneficial to the reader. Page 15	Concur the table will be shown in Section 4. Description of LERRD's.	X
Is this a Road Easement? Page 13	No This was a vegetative free zone. Due to the SWIF variance it is no longer needed and will be removed from this report	X
Expand, include info as stated in comment 7. Page 13	This description is incorrect. It will be rewritten to reflect new levees, levee raises, seepage berms, cutoff walls, and floodwalls. There is no new setback in this project.	X
Road Easement? Page 13	Yes this is the road easement. I will rename the easement.	X
Road Easement or a non standard estate? Page 13	This would have been a nonstandard estate but due to the SWIF variance it is no longer a requirement and shall be removed from the report.	X
All of these estates need to be expanded to include the info I discuss in comment #7. Page 13	Concur this section is being rewriting in Section 4. Description of LERRD's.	X
Who are the owners? Specify. Page 13	No owners are identified at this time only areas where potential borrow may be available. Borrow may not be suitable after testing so more than one site has been identified and is shown in Figure 2 Proposed Borrow Sites	X

We need to explain to the reader how the SWIF relates to theis porposed Mitigation Sites. It might be better to include the SWIF discussion in this section. Page 15	Concur I will move the SWIF discussion to the mitigation sites. The SWIF variance relates to more than just mitigation areas. The SWIF eliminates the road easements and the vegetative free zone for almost the entire project.	X
The document needs to specifically state whether we are buying land for mitigation or are is the project purchasing mitigation bank creditd. Should include a map showing these proposed sites, owner description (Private or non-federal sponsor owned). Is this amount included in the 01 Account? Need to specify. Page 15	The project will be purchasing mitigation credits. There are no banks proposed yet to map.	X
Is this paragraph a part of the Flood Protection Levee Easement, if so, this section needs to be included in that discussion above. Page 17	Concur: This has been moved to the discussion above	X
This Figure needs to be referenced in the discussion on Borrow Easements. Need to include acreage, owner description, Tract number, if known, Need to discuss Environmental impacts, suitability of material, and costs associated with the Borrow Material. Page 18	We know how many cubic yards and how many acres of borrow we need but we do not know if the material is suitable so we have over identified borrow areas. At this time in the feasibility study I have not been provided which actual parcels we are going to use. Based on the Natural Resources Conservation Service soil survey data, there are approximately 425 million Cubic Yards of material that potentially meets geotechnical requirements for level fill within an approximate 25 mile radius of the City of Sacramento. A map that proposed potential sites was created and several potential sites identified. The rough assumptions the Corp used was the material had to meet geotechnical requirements either by open undeveloped land or agricultural areas, and was located between ground surface and a depth of 2.5 feet below ground surface. In the high confidence areas in each basin the estimated amount of borrow needed within a 25 mile haul route radius is calculated below with costs for borrow. The high confidence areas were defined as areas where up to 48 inches of borrow could be excavated as opposed to the low confidence areas where only up to 12 inches of material would be available where 3 times the amount of land would be required. Potential land costs for borrow sites were developed by the Appraisal Section, Sacramento District, Corps of Engineers. The below quantities estimate the potential quantities of material required and the cost. American River South Basin High Confidence Area requires 69.76 AC of land for 275,743 CY of borrow = $453,400 + (35% cont + 15% severance= 226,700) = $680,100 American River North Basin High Confidence Area requires 0.64 AC of land for 2,519 CY of borrow =$4,186 (35% cont + 15% severance $2,093) = $6,279 Natomas Basin High Confidence Area requires 337.43 AC of land for 1,333,747 CY of borrow = $2,193,295 (35% cont + 15% severance = $1,096,647.50) = $3,289,942. The below map shows high confidence areas of available borrow where up to 48" of material can be excavated at one time.	X
These Figures need to be referenced in the above text regarding the SWIF, Bank Protection, and Road Easement estate discussions. Page 19	Concur. The SWIF discussion will occur all in the same portion of the report.	X
Need to be more specific in what this entails. Does the project impact high traffic rail lines that will have to be relocated? What about Railroad bridges and approaches thereto? Is that bridge in the picture below need to be relocated?	Yes the railroad bridge and track crossing over the Sacramento Bypass will be unable to utilize that bridge for two years. The other easement areas should not prevent the trains from moving and include no closure structures. Page 20	X
Is this paragraph needed if so it needs to be wrapped up in the estate text above. Page 21	No this paragraph has been deleted it is not needed.	X

What's the required estate for these features. Need to revise the Table. Page 22	The estates are shown in Section 4 description of LERRD's. These tables have been deleted.	X
What does the Letters mean in the Figure please specify. Page 24	I will provide a definition of the letters in the report.	X
What are the estates required for these reaches? Page 25	The estates are shown in table 1 of Section 4. These tables have been deleted.	X
Again, these paragraphs need to be included in the required estate s language above. Page 26	These tables have been moved see comment L54.	X
Not quite sure what this figure is trying to show and is it needed in the REP? Page 32	These are the design feature maps that accompany the estates required tables. They are showing the construction area and the improvements we are making. This is needed in the REP.	X
Same as comments 26 above. The paragraphs below need to be included in the discussions on the required estates.	Concur will add this to Section 4. Page 33	X
In a previous section you mention that permanent flowage easements are required. Please clarify. Page 39	I will revise this to say permanent	X
There is no mention of Non-Standard Estates? What about the Environmental Mititgation lands required for the project?	No non standard estates have been identified thus far. Environmental mitigation is will be at banks. Page 37	X
We need to expand this paragraph on how we are going to apply Navigational Servitude. The ER 405 talks specific to the requirements. Page 39	Will include longer discussion.	X
Not quite sure why this map is shown here? It's not referenced in the text? Need to spell out NAT Page 40	I will delete this map	X
Based on the Figure below, the flowage easement will impact an industrial area? Is that one of the acquisitions for this project? Could be a business relocation under PL 91-646. Page 41	I have inserted a new map that does not show the relocation of any businesses. Civil Engineering has a new map I will be including.	X
This value seems low and it does not match Table 7. What are the contingency costs? Page 44	25% contingency included already	X
Need to describe specifically whether these relocations are business or residential. Any mobile home parks impacted? Page 44	The relocations are 13 residential, 2 commercial buildings and 2 marinas. No mobile homes impacted	X
Briefly describe what these UF Relocations are. Page 47	Concur I will add a category	X
Does the report need this table? Can we delete it and use the Table 8 below? A little confusing Page 47	I can delete it.	X
Briefly describe these relocations Page 48	Concur	X

QUALITY CONTROL CERTIFICATE

Economic Risk Analysis Section, Planning Division

PROJECT NAME: AMERICAN RIVER COMMON FEATURES GRR, CALIFORNIA
PRODUCT: ECONOMIC APPENDIX
Actual Completion Date: 13-Aug-15
PROJECT MANAGER: DAN TIBBITS

The economic analysis noted below describes in a clear and concise manner the major assumptions, methods, data, and analytical tools used in the analysis, and summarizes the results of the analysis using table and text formats. This DQC effort has verified that the economic analysis is compliant with clearly established U.S. Army Corps of Engineers policies, principles and procedures; that the assumptions, methods, data and analytical tools used are appropriate for purposes of an economic analysis; that the level of detail and scope of the analysis are appropriate for purposes of an economic analysis; and that they results are reasonable and consistent within the context of an economic analysis.

Specific product reviewed: This DQC review focused on the updated net benefits and benefit-to-cost ratios and other small changes incorporating review comments. Also reviewed were the FDA files and methodology for Emergency and Cleanup costs. This iteration represents the draft FINAL Economic Appendix for the FRM milestone and the CWRB.

ECONOMIC LEAD

I have ensured that the above products were prepared in accordance with standard quality control practices. I have also incorporated or resolved all issues identified during District Quality Control (DQC) review.

Lead Economist:	Title: Economist	
Timi Shimabukuro	SHIMABUKURO.TIMI.R.1232082522 Digitally signed by SHIMABUKURO.TIMI.R.1232082522 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=SHIMABUKURO.TIMI.R.1232082522 Date: 2015.08.13 11:42:31 -07'00'	13 Aug 2015
Print name	Signature	Date

REVIEWER

I have reviewed the products noted above and find them to be in accordance with project requirements, standards of the profession, and USACE policies and standards.

DQC Reviewer:	Title: Chief, Economic & Risk Analysis Section	
Nicholas Applegate	APPLEGATE.NICHOLAS.JAMES.1246006640 Digitally signed by APPLEGATE.NICHOLAS.JAMES.1246006640 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=APPLEGATE.NICHOLAS.JAMES.1246006640 Date: 2015.08.13 09:50:39 -07'00'	13 Aug 2015
Print name	Signature	Date

RESOURCE PROVIDER

I have reviewed the quality control process and ensured that comments have been adequately address, documented and resolved.

Section Chief:	Title: Chief, Economic & Risk Analysis Section	
Nicholas Applegate	APPLEGATE.NICHOLAS.JAMES.1246006640 Digitally signed by APPLEGATE.NICHOLAS.JAMES.1246006640 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=APPLEGATE.NICHOLAS.JAMES.1246006640 Date: 2015.08.13 09:51:05 -07'00'	13 Aug 2015
Print name	Signature	Date

Economic and Risk Analysis Section
District Quality Control Review Comments
American River Common Features GRR
August 2015

Comments submitted by: Nick Applegate, Chief, Economic Risk Analysis Section, SPK
Responses submitted by: Timi Shimabukuro, Regional Economist
Backcheck submitted by: Nick Applegate, Chief, Economic Risk Analysis Section, SPK

Editorial Comments:

1. **Comment:** List of Tables: The bookmark link for Table 17, 44 and 46 appears to be broken, i.e. *"Error! Bookmark not defined."*
   Response: Concur. The List of Tables has been updated.
   Backcheck: Change verified, comment closed.

2. **Comment:** Sec 2.7.4, par 4. "The maximum clean-up cost of $10/ft2 was used for the West Sacramento economic assessment…" I believe this should say "ARCF" instead of "West Sacramento." Please revise.
   Response: Concur. This sentence has been revised.
   Backcheck: Change verified, comment closed.

3. **Comment:** Pg. 41, "(The Emergency Cost analysis was performed after the determination of the Final Array of Alternatives. Since none of the alternatives include the Natomas Basin, the emergency cost analysis did not include the Natomas Basin. More information about the Final Array of Alternatives is presented in Chapter 4.)" I'm not sure you need the parenthesis around these two sentences. Consider removing.
   Response: Concur. The parentheses have been removed.
   Backcheck: Change verified, comment closed.

4. **Comment:** Pg. 41, "Tables 17 below display the results of the HEC-FDA analysis." Change to "Table 17 below displays the results of the HEC-FDA analysis."
   Response: Concur. This sentence has been edited.
   Backcheck: Change verified, comment closed.

5. **Comment:** Sec 3.3.3, par 2. "the AEP values listed in Table 19 for each index point…" I think you may mean Table 18 as Table 19 doesn't have AEP's. Please verify.
   Response: Concur. The reference to "Table 19" has been changed to "Table 18."
   Backcheck: Change verified, comment closed.

6. **Comment:** Sec 3.3.4, par 1. Fix Table reference from Table 18 to Table 19.
   Response: Concur. Reference to "Table 18" has been changed to "Table 19."
   Backcheck: Change verified, comment closed.

Technical Comments:

7. **Comment:** Section 2.2, par 1. Given the CWRB in Dec, we will most-likely be required to update prices to October 2015 using the new FY16 discount rate (when it comes out). We could update to Oct 2015 now using a trend analysis, but it's probably prudent to wait until the new discount rate is out.
   Response: Concur. Costs and benefits will have to be updated once the FY16 (October 2015) federal discount rate is available.
   Backcheck: Comment closed.

8. **Comment:** Section 2.3, par 1. "200-yr event." At the very least, recommend footnoting this to explain what a 200-yr event actually means. For example: "200-yr" refers to an event with a 1/200 (0.5%) chance of occurrence in any given year, also known as the 0.5% Annual Chance Exceedance (ACE) event. These terms will be used interchangeably throughout this document."
   Response: Concur. A statement identifying the various terms and that either is used throughout the Economic Appendix has been added.
   Backcheck: Change verified, comment closed.

9. **Comment:** Figure's 5 and 6 aren't very high quality and are difficult to read. Do we have any better graphics that show the delineation of the EIA's? In the case of Figure 5, there are no boundaries to understand where one area ends and another begins.
   Response: Concur. Figures 5 and 6 will be replaced with better quality maps during the next report update (October 2015).
   Backcheck: Comment closed.

10. **Comment:** Table 43. Costs for the "Fix Creeks" increment appear to have risen by ~$30M (15%) since the last iteration in March. What is the reason for this cost increase? This increase is significant because it appears to make that increment economically infeasible. Later discussions related to Emergency/Cleanup benefits seem to indicate a $1.45M annual benefit that is not included in this table, which would bump the BCR back up over 1:1. Can the emergency/cleanup benefits be added to this table?
    Response: Concur. Costs have increased for the tributaries. Alternative 1 has an additional $1.25 million in benefits associated with the prevention of emergency cost losses; Alternative 2 has an additional $1.45 million in benefits. The damages/benefits related to the prevention of emergency cost losses have been incorporated into the incremental analyses. Including the emergency cost benefits increases the BCRs for the "Creeks" increment to 1.0 (Alternative 1) and 1.2 (Alternative 2).
    Backcheck: Verified, comment closed.

11. **Comment:** Pg. 59, Emergency Cost discussion. Recommend moving this entire section (including Tables 45 & 46) up to the beginning of Section 4.11 and prior to the incremental Net Benefit Analysis tables. Then add in the emergency/cleanup benefit totals into the incremental tables 42, 43 and 44.

Response: Concur. The Emergency Cost section was moved up (to Section 4.9) prior to the incremental analyses. The incremental analyses now incorporate the damages/benefits related to emergency cost losses.
Backcheck: Verified, comment closed.

12. **Comment:** Tables 47 and 48. Please add a footnote to the Total First Costs indicating that Cultural Resources were removed per policy. I.e. "Cultural resources data recovery costs ($6.17M) are not included in economic costs per USACE policy."
Response: Concur. Footnotes explaining that cultural resource preservation costs have been excluded from the economic analysis have been added to Tables 44-45 and 49-50.
Backcheck: Verified, comment closed.

13. **Comment:** Attachment 3, OSE discussion. Please add a subsection with the same discussion of social justice for the "creeks" area that was added to the main report.
Response: Concur. A section discussing the social justice aspect of making FRM improvements to the creeks has been included in the OSE analysis/report (Life Safety Evaluation/Population at Risk section).
Backcheck: Verified, comment closed.

HEC-FDA Comments (Emergency/Cleanup):

14. **Comment:** The FDA models and output files associated with Emergency costs were reviewed and there were no significant issues. The Inventory values were input correctly using $10/square foot for cleanup costs on all structures and $11,244 for all residential structures for Temporary Housing assistance. Depth-damage curves were appropriately applied. The results and proportions relative to structure/content damages are consistent with the findings of the Authorized Sutter feasibility study (which used a similar methodology). Adding these categories into the final array makes the Economic analysis more complete. No response necessary.
Response: No response necessary.
Backcheck: Comment closed.

QUALITY CONTROL CERTIFICATE

Environmental Planning Section, Planning Division

PROJECT NAME: American River Common Features Project GRR
PRODUCT: Habitat Mitigation Monitoring and Adaptive Management Plan
ACTUAL COMPLETION DATE:

PROJECT MANAGER: Dan Tibbits

The District has completed review of the habitat mitigation monitoring and adaptive management plan for the American River Common Features Project General Reevaluation Report. Certification is hereby given that all quality control activities defined in the Project Review Plan appropriate to the level of risk and complexity inherent in the product have been completed. Documentation of the quality control process is enclosed.

Compliance with clearly established principles and procedures, utilizing clearly justified and valid assumptions, has been verified. This includes assumptions, methods, procedures and materials used in analyses; the appropriateness of data used and level of data obtained; and the reasonableness of the results, including whether the product meets consistency with law and existing Corps policy. All appropriate DQC comments have been incorporated into this project. The undersigned recommends certification of the quality control process for this product.

ENVIRONMENTAL LEAD

I have ensured that the above products were prepared in accordance with standard quality control practices. I have also incorporated or resolved all issues identified during DQC review.

Environmental Lead: Anne Baker Title: Senior Environmental Manager

Print Name	Signature	Date
		12/1/15

REVIEWER

I have reviewed the products noted above and find them to be in accordance with project requirements, standards of the profession, and USACE policies and standards.

DQC Reviewer: Dan Artho Title: Senior Environmental Manager

Print Name	Signature	Date
		12/1/15

RESOURCE PROVIDER

I have reviewed the quality control process and ensured that comments have been adequately addressed, documented, and resolved.

for Resource Provider: Josh Garcia Title: Chief, Environmental Analysis Section

Print Name	Signature	Date
Zimmerle, Mark T.		1/7/16

DQC BACKCHECK -- Appendix I Mitigation and Monitoring Plan_DFA.docx

Main document changes and comments

Page 4: Comment [DFA1] **L2PDRDFA** **11/24/2015 3:37:00 PM**

Repeat of statement above. Suggest deleting. Or is this supposed to be on American River?

RESPONSE: Combined the sentences so that the description seems less repetitive.

DFA BACKCHECK: Comment was in reference to the discussion about levee raising on the Sac River in the third sentence of the paragraph. However, this is more of an editorial comment than a content-related comment and the paragraph as it currently stands sufficiently provides the summary of the proposed measure. COMMENT CLOSED.

Page 5: Comment [DFA2] **L2PDRDFA** **11/24/2015 3:38:00 PM**

Does this apply to Sacramento River as well? Might want to indicate so in the Figure title if that is the case.

RESPONSE: Figure 1 is the American River scenario, while Figure 2 is the Sacramento River scenario. The rivers have been added to the two figures.

BACKCHECK DFA: Perfect. COMMENT CLOSED.

Page 2: Comment [DFA3] **L2PDRDFA** **11/30/2015 4:00:00 PM**

Are the HSIs for the future without project estimated to be the same as the future with-project? If so, you need to state that. If not, you should show a separate table for the FWOP HSI values for each target year.

Response: The FWOP HIS output is different so we've added in the table that show the values for each target year.

BACKCHECK DFA: Comment Closed.

Page 2: Comment [SRR4] **Sarah Ross** **11/22/2015 9:36:00 PM**

Add reference to paragraph above

Page 3: Comment [DFA5] **L2PDRDFA** **11/30/2015 4:00:00 PM**

This table shows the Mayhew Drain HEP results, correct? If that is the case, then you should indicate as such in the Table title. I would also recommend adding a footnote to the table explaining how this information was applied to ARCF mitigation requirements.

Response: Added Mayhew drain project to the title of the table and added a foot not explaining how the information was applied to ARCF.

BACKCHECK DFA: Acceptable. Comment closed.

Page 3: Comment [DFA6] **L2PDRDFA** **11/30/2015 4:05:00 PM**

Where are the results of the CE/ICA? Recommend showing the standard line and bar graphs that plot the CE plants and the incremental cost comparison between mitigation proposals.

Response: The CE/ICA results can be found at the end of Appendix I.

BACKCHECK DFA: Text needed a reference to where the CE/ICA is located. Reference included. Comment Closed.

Page 3: Comment [DFA7]	L2PDRDFA	11/30/2015 4:05:00 PM

Should this be AAHU's?

Response: Concur

BACKCHECK DFA: Comment Closed.

Page 5: Comment [DFA8]	L2PDRDFA	11/30/2015 4:06:00 PM

Indicate the specific source of these requirements; e.g., BOs, CAR, FWS Mitigation Policy, etc.

RESPONSE: Concur. Revised sentence to refer to the BOs and CAR.

BACKCHECK DFA: Comment Closed.

Page 6: Comment [DFA9]	L2PDRDFA	11/30/2015 4:06:00 PM

Make sure to remove this reference to West Sac GRR in the ARCF MMAMP, and vice-versa for the West Sac plan.

Response. Concur. Will remove all references to the other GRR when we finalize the HMMAMP

BACKCHECK DFA: Comment closed.

Page 6: Comment [DFA10]	L2PDRDFA	11/30/2015 4:07:00 PM

See comment above.

Response. Concur.

BACKCHECK DFA: Comment closed.

Page 7: Comment [DFA11]	L2PDRDFA	11/30/2015 4:08:00 PM

General question: Does onsite mitigation require purchase of land in fee title to guarantee land remains habitat mitigation in perpetuity?

Response. Yes, onsite mitigation must be purchased & protected in perpetuity. It might not be possible for bank protection sites though. For the Parkway, we are leasing the land, so there is an additional fee for land lease. Do you want us to add more info about this into the plan?

BACKCHECK DFA: Not necessary, if identified as such in the EIS. Comment closed.

Page 10: Comment [DFA12]	L2PDRDFA	11/30/2015 4:09:00 PM

Is this supposed to be 50%?

RESPONSE: Yes. The percent sign has been added.

BACKCHECK DFA: Comment closed.

Page 10: Comment [DFA13]	L2PDRDFA	11/30/2015 4:09:00 PM

Is there a specific depth that should be identified, or distance from shoreline?

Response. The specific depth is currently unknown and would be determined through preconstruction monitoring and modeling efforts. As a result, at this time based on current science the full width of the river/channel should be monitored. The table has been revised to reflect this.

BACKCHECK DFA: Comment closed.

Page 14: Comment [DFA14] **L2PDRDFA** **11/30/2015 4:13:00 PM**

What are these performance standards based off of? Recommend indicating the source that these standards were derived from.

RESPONSE: Added in the note below the table.

Dan, it would be helpful if you can weigh in on whether or not Natomas is a reasonable source for HQ purposes. I'm trying to use the proximity/habitat quality argument on why its valid, but it is not a Corps project, and I'm worried that they would prefer to see something from the Corps as a source. Sutter had very similar, but slightly lower performance standards that we could use as a Corps source – they range from 80% to 60% over time. I would be comfortable with switching to those if you think it is a stronger argument.

BACKCHECK DFA: Suggest keeping these in light of the fact that success criteria from several different projects were considered. Comment closed.

Page 15: Comment [DFA15] **L2PDRDFA** **11/30/2015 4:13:00 PM**

Where are the reference reaches? How do the success criteria relate to the reference reaches?

Response: I'm not sure that "reference reaches" was an appropriate goal. I think it would be more accurate to say that our long-term goal is to provide replacement habitat similar to the habitat that was impacted by project construction. The goal is compensation, not enhancement. The language has been adjusted to reflect this.

BACKCHECK DFA: Concur. Comment closed.

Page 16: Comment [DFA16] **L2PDRDFA** **11/30/2015 4:14:00 PM**

What sources, literature, expert opinion, etc., supports these performance standards?

Response. See above response and added footnote

BACKCHECK DFA: Comment closed.

Page 21: Comment [DFA17] **L2PDRDFA** **11/30/2015 4:15:00 PM**

What is the basis for these standards?

RESPONSE: Added note to table establishing the source of the standards.

BACKCHECK DFA: Comment closed.

Page 24: Comment [DFA18] **L2PDRDFA** **12/1/2015 8:59:00 AM**

I don't think you have included sufficient justification for development of a physical model for this study as called for by HQ review comments. Perhaps indicating that existing info and model outputs suggested a jeopardy opinion to green sturgeon. Also, why are both an EFM and Physical model necessary?

Response. Added language clarifying that the purpose of this modeling effort is to address the differing resource needs for each listed species and inform design refinements for the projects.

BACKCHECK DFA: Still not clear if this is needed per BiOp requirements. I'll defer to SME's about the need for this, but suggest presenting stronger justification for this extra cost. Comment closed.

Page 25: Comment [DFA19] **L2PDRDFA** **12/1/2015 8:54:00 AM**

Would it be from SAM or from the EFM Model developed for green sturgeon?

RESPONSE: I think the idea right now is that we don't know what the EFM model will tell us yet, therefore the SAM is still the best available tool, and the performance standards are currently developed from the SAM. With the long term goal to refine them based on the results of the EFM model. I reworded this paragraph slightly to focus on the present standard being from SAM. Also reworded the paragraph associated with the below bullet list to reflect that those could be future performance standards developed from EFM.

BACKCHECK DFA: Comment closed.

Page 26: Comment [DFA20] **L2PDRDFA** **12/1/2015 8:54:00 AM**

What establishes these as appropriate standards for sturgeon mitigation success? Is there literature, studies, etc., that supports this?

Response. The District fisheries team met with NMFS to coordinate appropriate performance standards based on the current best available science. Their determination was that the current best data is based on the SAM analysis, therefore they selected outputs from the SAM that they felt were likely relevant to sturgeon and that would likely remain relevant even with the future modeling efforts.

BACKCHECK DFA: Comment closed.

Page 30: Comment [DFA21] **L2PDRDFA** **12/1/2015 8:47:00 AM**

Per WRRDA 2007, you will need to identify the costs of monitoring separate from the costs for adaptive management.

Response. Concur. The section has been revised to present the monitoring costs separate from the adaptive management costs, and a total for the overall plan.

BACKCHECK DFA: Comment closed.

Header and footer changes

Text Box changes

Header and footer text box changes

Footnote changes

Endnote changes

FLOOD RISK MANAGEMENT
PLANNING CENTER OF EXPERTISE
REVIEW MANAGEMENT ORGANIZATION

AGENCY TECHNICAL REVIEW REPORT
SEPTEMBER 2015

Of the:

AMERICAN RIVER WATERSHED
COMMON FEATURES
GENERAL REEVALUATION REPORT
SEPTEMBER 2015 and ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT
SEPTEMBER 2015

Sacramento District

US Army Corps of Engineers ®

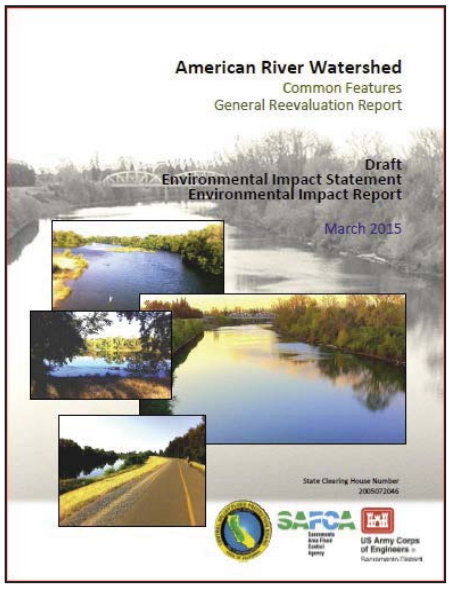
TABLE OF CONTENTS

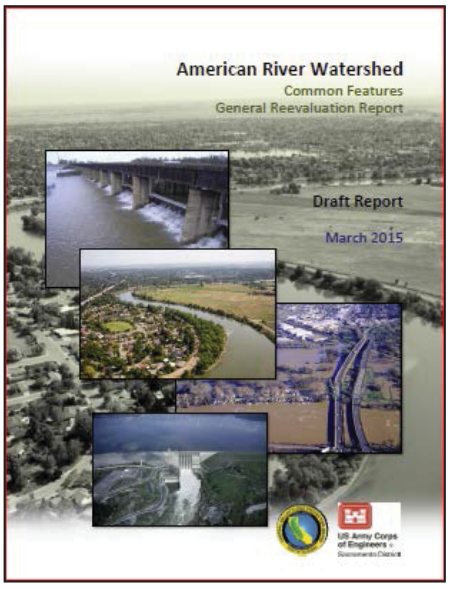
AGENCY TECHNICAL REVIEW REPORT

ENCLOSURES

Agency Technical Review Report

Subject: Review report for the **AMERICAN RIVER WATERSHED, COMMON FEATURES, FINAL GENERAL REEVALUATION REPORT, September 2015, and FINAL ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT, September 2015**, Sacramento District. Document covers below show the draft general reevaluation report (GRR) and National Environmental Policy Act document covers for the environmental impact statement/environmental impact report (EIS/EIR) as examples of the final report covers. At the request of the review team lead, the District provided track change documents to the review team to facilitate examination of the revisions made to the report between the backcheck documents used to complete the ATR of the draft GRR and EIS/EIR documents in the spring of 2015 and the final GRR and EIS/EIR documents used in August 2015 to start the ATR of the final GRR and EIS/EIR documents. Final report cover versions were not necessary.





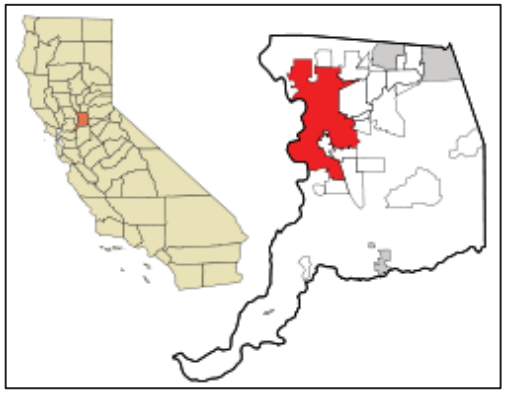
1. **Scope and Purpose of Review**. The purpose of this review report is to document agency technical review (ATR) for the subject product. The review was conducted for the Sacramento District (District). The primary point of contact for the District was Dan P. Tibbitts, CESPK-PM-C, Project Manager. The ATR team (ATRT) was lead by Marc L. Masnor, P.E., CESWF-PEC-PF (Tulsa, OK) for completion of the ATR. The Flood Risk Management (FRM) Planning Center of Expertise (PCX) was the Review Management Organization (RMO).

A previous ATR was initiated in September 2014 and completed in June 2015 for the draft general reevaluation report and draft environmental impact statement/environmental impact report.

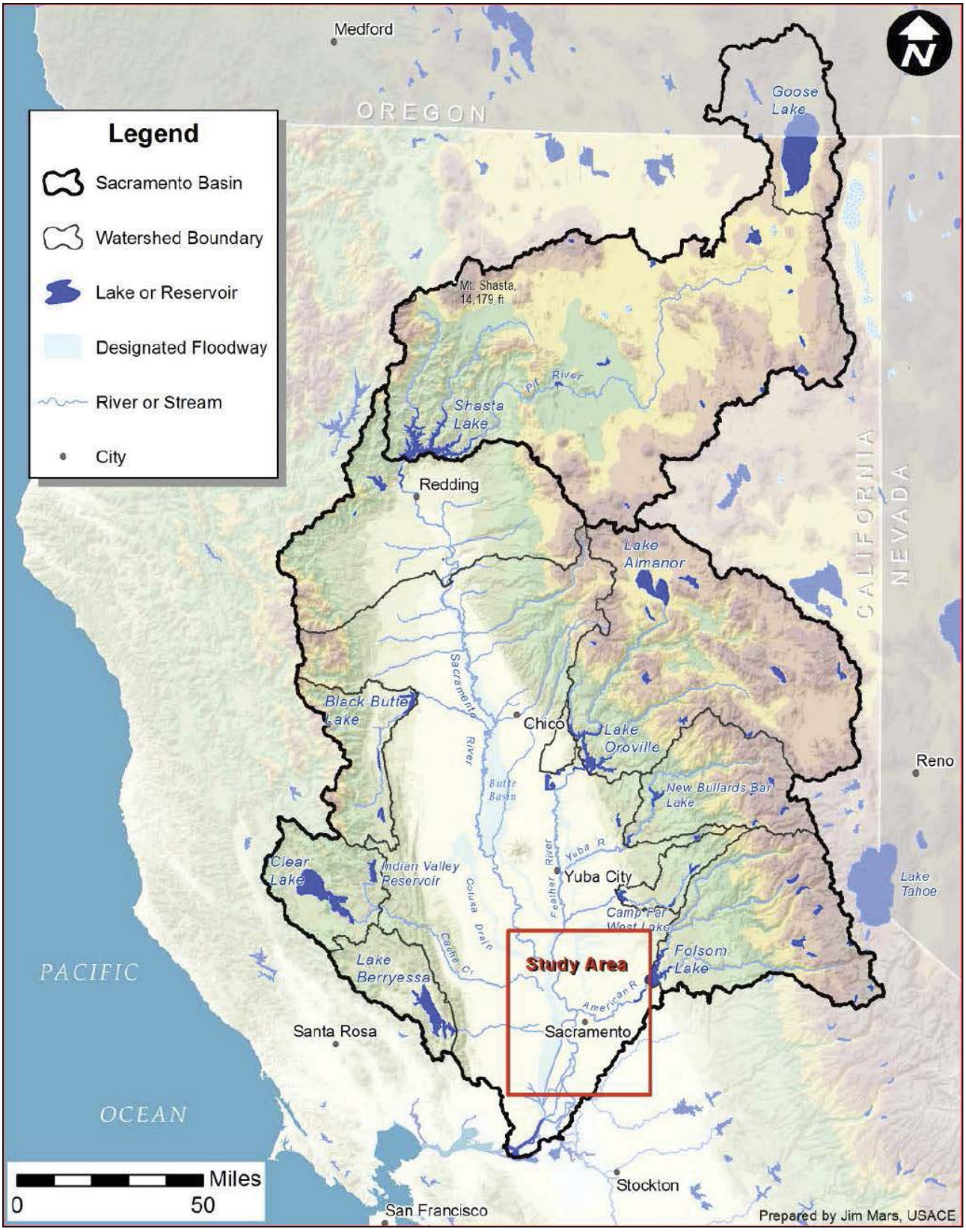
This ATR was initiated in August 2015. Comments were entered by the ATRT between August and September 2015. All comments were closed.

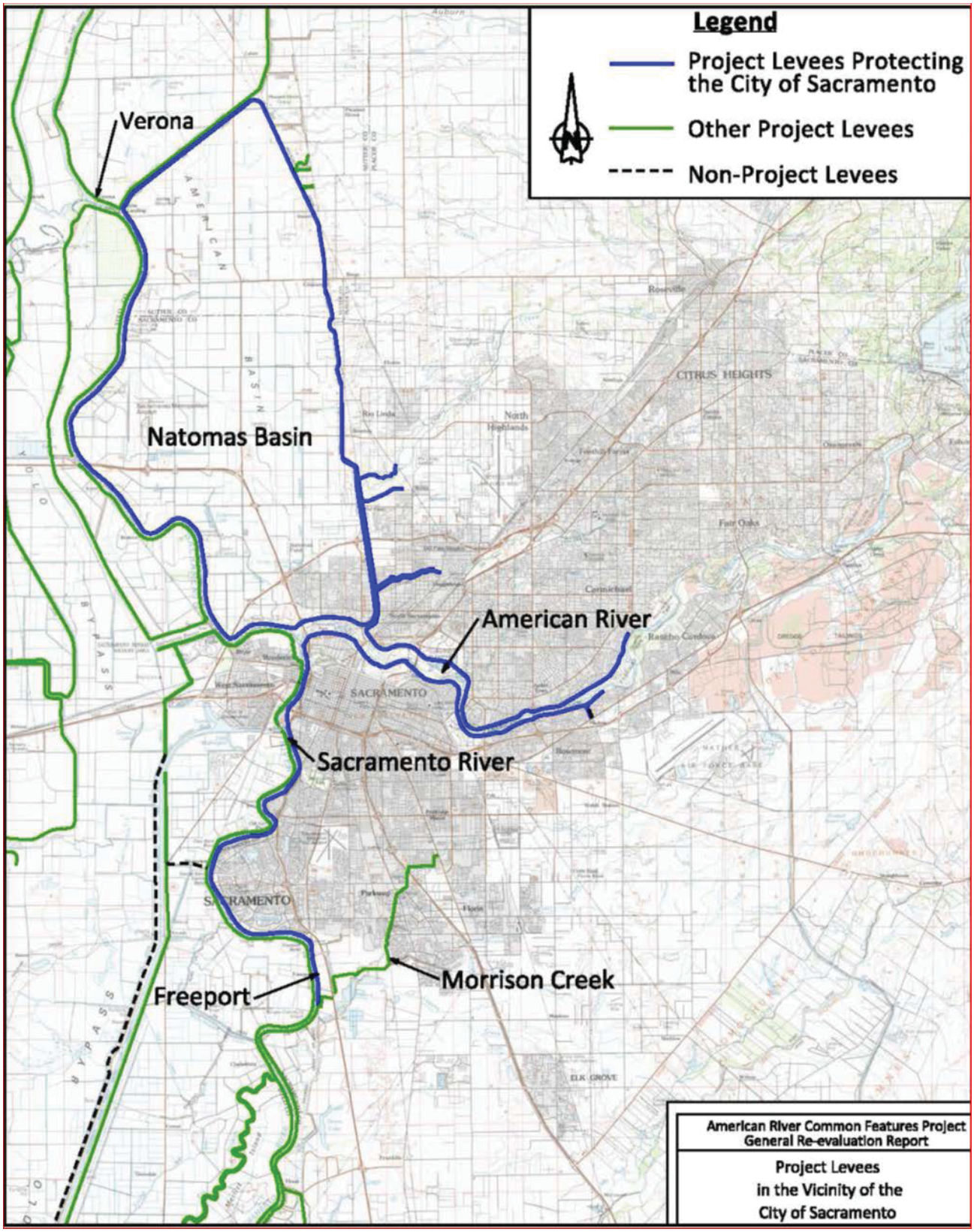
2. **References**. This review report was prepared in response to EC 1165-2-214, 15 December 2012, Water Resources Policies and Authorities, CIVIL WORKS REVIEW. The review documents reside online at ProjNet (www.projnet.org), DrChecks Project and Review titles: Project: ARCF - General Reevaluation Report (GRR), TSP & Attachments, American River Common Features (ARCF), California (P2 #149827), Review: Review: ATR Final EIS/EIR (10-14 Aug 2015) (00031).

3. **Project Description**. The study area is located in the general vicinity of the confluence of the Sacramento and American Rivers, and includes the City of Sacramento (right inset in red), CA (left inset), and surrounding areas in Sacramento County (left inset, county shown in red).



The Sacramento River is the largest river and watershed system in California and transports 31% of the state's total surface runoff. The upper watershed is drained by three rivers; the upper Sacramento River, the McCloud River, and the Pit River, which join at Lake Shasta, a 4.5 million acre foot reservoir formed by Shasta Dam. The Sacramento River then flows south through the northern Central Valley of California. The Sacramento River watershed covers an area of approximately 27,000 square miles. Major tributaries of the Sacramento River include the Feather River, the Yuba River, and the American River. (see figures next two pages)


Legend
Sacramento Basin
Watershed Boundary
Lake or Reservoir
Designated Floodway
River or Stream
City
Medford
OREGON
Goose Lake
Mt. Shasta, 14,179 ft
Pit River
Shasta Lake
Redding
Lake Almanor
CALIFORNIA
NEVADA
Sacramento River
Black Butte Lake
Chico
Lake Oroville
Reno
Butte Basin
New Bullards Bar Lake
Yuba R
Feather River
Yuba City
Clear Lake
Indian Valley Reservoir
Colusa Drain
Camp Far West Lake
Lake Tahoe
Cache Cr
Lake Berryessa
Study Area
Folsom Lake
American R
PACIFIC
Santa Rosa
Sacramento
OCEAN
Stockton
Miles
0
50
San Francisco
Prepared by Jim Mars, USACE


Legend
Project Levees Protecting the City of Sacramento
Other Project Levees
Non-Project Levees
Verona
Natomas Basin
American River
Sacramento River
Freeport
Morrison Creek
SACRAMENTO
CITRUS HEIGHTS
American River Common Features Project
General Re-evaluation Report
Project Levees
in the Vicinity of the
City of Sacramento

The study area consists of the north and south banks of the American River downstream of Folsom Dam, the Natomas Basin, the east bank of the Sacramento River, and areas surrounding five other smaller waterways which are sources of potential flooding. Each area is at risk of flooding from multiple sources.

The three basins are referred to as the American River South (ARS) basin, the American River North (ARN) basin, and the Natomas (NAT) basin. (see figure next page)

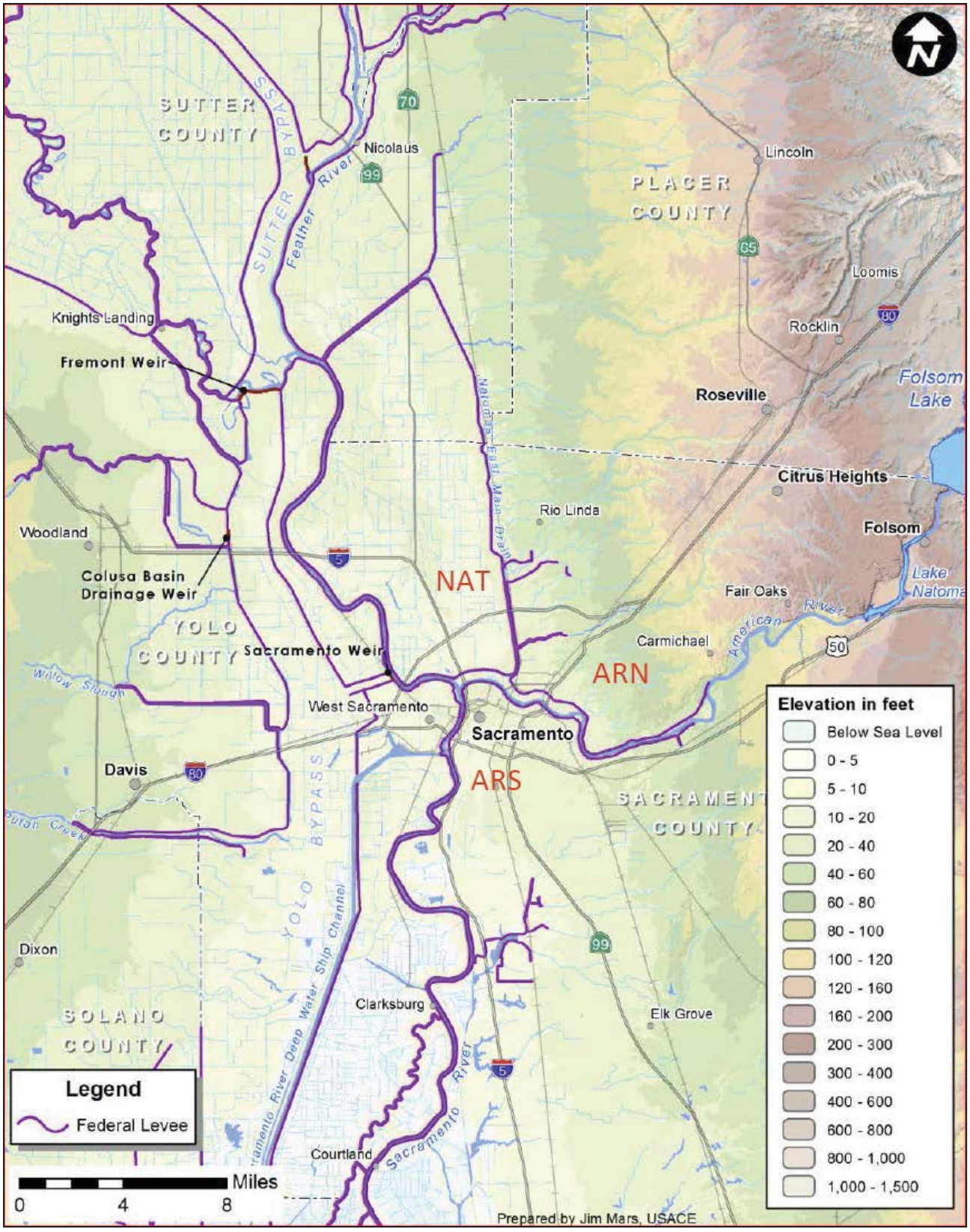
1. The ARS basin is protected by 25 miles of levee along the American and Sacramento Rivers. There are over 400,000 people at risk of flooding in this basin.

2. The ARN basin is protected by 25 miles of levee along the American River, the Natomas East Main Drainage Canal (NEMDC), Arcade Creek, and Dry/Robla Creeks. There are approximately 100,000 people at risk of flooding in this basin.

3. The NAT basin is protected by 42 miles of levee along the American and Sacramento Rivers, NEMDC, the Pleasant Grove Creek Canal, and the Natomas Cross Canal. There are approximately 100,000 people at risk of flooding in this basin.

The purpose of the study is flood risk management. Potential FRM measures range from modifying and/or increasing conveyance through raising and strengthening levees, widening channels and bypass areas, modifying weirs and bypasses. Non-structural floodplain management measures would also be considered. The estimated cost for the project is approximately $2 billion.

The authorized project features were developed to work in conjunction with the authorized Folsom Dam modifications and the increased flow releases that would be anticipated. These features included seepage remediation along approximately 22 miles of the American River and construction of levee strengthening and raising of 12 miles of Sacramento River levee in Natomas. Additionally, the authorization includes construction of seepage remediation and levee raises along four stretches of the American River and construction of levee strengthening and raising of 5 miles of the Natomas Cross Canal levee in Natomas.


SUTTER COUNTY
SUTTER BYPASS
Feather River
Nicolaus
70
99
Lincoln
PLACER COUNTY
65
Loomis
Rocklin
80
Knights Landing
Fremont Weir
Roseville
Folsom Lake
Natomas East Main Drain
Citrus Heights
Rio Linda
Folsom
Woodland
Colusa Basin Drainage Weir
NAT
Fair Oaks
Lake Natoma
American River
YOLO COUNTY
Sacramento Weir
Carmichael
50
ARN
Willow Slough
West Sacramento
Sacramento
Davis
80
ARS
SACRAMENTO COUNTY
Putah Creek
YOLO BYPASS
Deep Water Ship Channel
Dixon
99
Clarksburg
Elk Grove
SOLANO COUNTY
5
Sacramento River
Courtland
Legend
Federal Levee
Miles
0
4
8
Elevation in feet
Below Sea Level
0 - 5
5 - 10
10 - 20
20 - 40
40 - 60
60 - 80
80 - 100
100 - 120
120 - 160
160 - 200
200 - 300
300 - 400
400 - 600
600 - 800
800 - 1,000
1,000 - 1,500
Prepared by Jim Mars, USACE

4. **Review Team**. Disciplines identified in the review plan for the ATR were met by the following team members. Team members that completed the ATR are identified.

ATRT Lead – Marc Masnor P.E., Civil Engineer, CESWF-PEC-PF (Tulsa, OK) – 918-669-7349, Marc.L.Masnor@usace.army.mil. Mr. Masnor is a civil works water resources planner in the Plan Formulation Section of the Southwestern Division Office (SWD) Regional Planning and Environmental Center (RPEC), headquartered in the Fort Worth District Office (CESWF) in Fort Worth, TX. He works from the Tulsa District Office (CESWT) in Tulsa, OK, 1645 S. 101st East Ave, Tulsa, OK 74128-4609. He has 37 years of experience with the Corps of Engineers, Tulsa District, Tulsa, OK. Marc is a SWD regional technical specialist (RTS) for plan formulation and National Environmental Policy Act evaluation of flood risk management (FRM), ecosystem restoration (ECO), and water management and reallocation studies (WMRS). As a senior plan formulation specialist and regional technical specialist, he assists in the development of unique or complex formulation and analysis techniques within the framework of Corps of Engineers guidance; Federal, state, and local laws and regulations; and stakeholder interests. He has been both study manager and project manager for many Tulsa District planning studies that involved flood risk management, ecosystem restoration, comprehensive watershed studies, water supply, reservoir storage reallocation, navigation, hydropower, and chloride control. Mr. Masnor has worked in hydrology, design, project management, and civil works planning offices within the Tulsa District and has completed a wide variety of water resources studies in Kansas, Oklahoma, and Texas. Studies included the evaluation of navigation and hydropower expansion on the McClellan-Kerr Navigation system; a system of 122 small reservoirs in the Grand-Neosho Basin; chloride control evaluations in the Arkansas and Red River Basins; multiple purpose reservoirs system formulation; storage reallocation studies, regional needs studies; watershed ecosystem restoration evaluations; and several local levee, channel, detention, and buyout plans. He currently provides support for offices within (a) the RPEC and Districts within SWD, (b) three planning centers of expertise (PCX) review management organizations (RMO) for FRM, ECO, and WMRS, (c) multiple division office RMOs across the Corps, and (d) the Risk Management Center (RMC). He has participated in or lead roughly 100 ATRs or DQCs.

(a) He supports the RPEC and the SWD as the plan formulation RTS, as an agency technical review (ATR) team member or team lead for

continuing authority projects, as a district quality control (DQC) team member, and as a project delivery team (PDT) member.
(b) He supports three PCX RMOs as an ATR Team lead. In that capacity he selects and manages ATR teams to analyze pre-authorization feasibility studies conducted by Districts related to flood risk management, water management and reallocation, ecosystem restoration, and navigation. He has been the Southwestern Division Regional Manager for the FRM PCX National Manager, Eric Thaut (SPD) since 2008 through the present. Marc participates in a national team that develops tools in support of the PCX RMOs managing body called the PCX Guild. This team meets at the direction of the Guild to prepare supplemental review tools such as checklists, templates, and training materials for ATR and PDT teams.
(c) He supports Division RMOs as an ATR lead. In that capacity he selects and manages ATR teams to analyze post-authorization implementation studies including design documentation reports (DDR) and detailed project reports (DPR), and plans and specifications (P&S), generally for FRM, ECO, and WMRS. Other reviews include building replacements, water quality project modifications, and an upcoming desalinization plant.
(d) He supports the RMC RMO as an ATR lead, also to select and manage ATR teams for review of feasibility and implementation documents.

Plan Formulation - Eric S. Lynn, CENWK-PM-PF - 816-389-3258 Eric.S.Lynn@usace.army.mil. Mr. Lynn is a registered Professional Engineer in the state of Kansas and a registered Project Management Professional. He has a bachelors of science degree in environmental engineering from Rensselaer Polytechnic Institute and a Master's of Civil Engineering in Water Resources from the University of Kansas. Mr. Lynn joined the Corps of Engineers in Jan 2004 and serves as a Planner/Project Manager in the Planning Branch, Plan Formulation Section. Mr. Lynn's duties have included the management and successful completion of multiple Flood Risk Management Feasibility Studies under the General Investigations and Continuing Authorities Programs. Prior to serving with the Corps Mr. Lynn spent seven years working for local County and Municipal government agencies managing construction and rehabilitation of wastewater and stormwater infrastructure, including local sponsor maintenance requirements for Federal levees. Mr. Lynn is an approved plan formulation reviewer for FRM.

Economics - Michael Hallisy (CESPL-PD-E), 213-452-3815, michael.j.hallisy@usace.army.mil. Mr. Hallisy is the Chief of the

Economics Section for the Los Angeles District, Corps of Engineers. He has worked as an Economist for 21 years, including several years as SPD's Regional Technical Specialist in flood risk management economics, and the past seven years as the Chief of the Economics Section. He has also served temporary assignments as Division Economist for SPD and as Assistant Chief, Planning Division for SPL. In addition to his Corps work experience, he worked for 1.5 years for a financial consulting firm providing financial analysis and business valuations, primarily for litigation support cases. Michael holds a BS in Finance and Economics from the University of Oregon, and an MBA in Corporate Finance from the University of Texas at Austin. During his tenure with the Corps, Mike has served on dozens of ATR teams, primarily as an economics reviewer. He has also served as ATR Lead on several FRM studies. He is certified as an agency technical reviewer for both flood risk economics and risk analysis. Mr. Hallisy is an approved economic reviewer for FRM.

Biologist – Tiffany Bostwick, CESPL-PD-RN – 213-452-3845, Tiffany.Bostwick@usace.army.mil. Ms. Bostwick is a biologist and environmental coordinator with the Corps of Engineers Los Angeles District since 2002, and provides biological and environmental management support to the District on various flood risk management, navigation, and ecosystem restoration projects within the Corps civil works program. Prior to serving with the Corps Ms. Bostwick previously worked as a field crew member for the Maui Invasive Species Committee on the island of Maui, Hawaii. Ms. Bostwick earned a bachelor's of science degree in biology from the California Lutheran University. Ms. Bostwick was an initial team member and completed the review prior to the establishment of an approved list for environmental reviewers.

Archaeologist - Gregory D. Everhart, CESPA-PM-LE – 505-342-3352 gregory.d.everhart@usace.army.mil. Mr. Everhart serves as a District Archaeologist with the U.S. Army Corps of Engineers, Albuquerque District, in Albuquerque, New Mexico and is listed as a Corps Agency Technical Review Cultural Resources Subject Matter Expert. Mr. Everhart maintains credentials as a Principal Investigator to be listed on the New Mexico and Colorado lists of Permitted Professionals. Mr. Everhart has a Bachelor of Science degree in archaeology and came to the Corps Albuquerque District as an park ranger then as a archaeologist/student trainee working in that position from 1992 to 1997 while attending college. He was promoted to a Federal archaeologist position in September 1997 and has served in that professional position to this date (17 years). Mr. Everhart has an

intimate knowledge of the National Historic Preservation Act Section 106 consultation and compliance process working with the NM and CO State Historic Preservation Officers as well as with tribes and several Tribal Historic Preservation Officers. Mr. Everhart also has a thorough knowledge of the NEPA process and documentation thereof. Mr. Everhart has written over 100 archaeological survey reports and successfully conducted Section 106 consultation on those projects. He previously conducted independent technical and Agency Technical Reviews for three projects in CA.

Hydraulic Engineer - Shih (James) H. Chieh, CESPL-ED-HH - 213-452-3571, Shih.H.Chieh@usace.army.mil. Mr. Chieh is a registered professional engineer in California. James is a Senior Hydraulic Engineer, Hydrology & Hydraulics Branch, Los Angeles District. He conducts flood frequency analysis, rainfall runoff modeling, floodplain analysis, sediment transport analysis, and reservoir routing simulations for various water resources projects. He also conducts groundwater modeling, water budget analysis, and water quality analysis for various habitat restoration and wetland projects. He has served as ATR member and reviewed various project on hydrology, hydraulics, sediment transport, flood plain studies, and coastal engineering studies. He has both work and review experience in the area of hydrology (HEC-FFA, HEC-HMS), hydraulics (HEC-RAS, FLO2D), and groundwater (MODFLOW, MT3D). Mr. Chieh is approved for 50 HH&S areas of interest in CERCAP including the models and evaluations for this study.

Cost Engineering MCX - James G Neubauer, P.E. CENWW - 509-527-7332, James.G.Neubauer@usace.army.mil. Mr. Neubauer is the Technical Cost Engineering Lead for the Cost Engineering District of Expertise (DX) for Civil Works located in Walla Walla, WA. Jim has 12 years of civil and military cost engineer experience. He has been the lead estimator in Albuquerque, NM, Chief of Cost - Europe, and lead estimator Walla Walla, WA. He has 11 years civil works construction experience in Wyoming, Europe, and Walla Walla, WA. Mr. Neubauer has 5 years military and civil project manager experience for Europe and Albuquerque projects. Jim has participated on numerous technical review teams, including several projects with cost estimates greater than $1billion. Jim is the Cost DX ATR Coordinator, is a Certified Cost Engineer, and has his PM1 Certification.

Cost Engineering - Gary R. Smith, CENWW-EC - 651-731-3910, - grs52@comcast.net. Mr. Smith is a registered Professional Engineer in the state of Minnesota, has been a practicing engineer since 1974, and

has a bachelors of science degree in civil engineering from the University of Minnesota. Mr. Smith joined the Corps of Engineers in July 1974 and serves as a Cost Engineer for the Technical Center of Expertise Cost Engineering. Mr. Smith was approved and assigned to the ATRT by the Cost Engineering MCX.

Geotechnical - Glen M. Bellew, CENWK-ED-GD - 816-389-3553 Glen.M.Bellew@usace.army.mil. Mr. Bellew is a licensed Professional Engineer in the state of Missouri. He is a double graduate of the University of Missouri – Columbia, receiving a Bachelor's degree in Civil Engineering in 2002 and a Master's Degree in Civil Engineering with a Geotechnical emphasis in 2004. Mr. Bellew joinied the Corps in 2004, and he has worked extensively on flood risk management projects including dams, levees, and floodwalls. He has experience in feasibility studies, design, construction, risk assessments, inspection, and rehabilitation of flood risk management projects. Mr. Bellew served as a Regional Technical Specialist for 4 years prior to becoming Chief of the Geotechnical Design and Dam Safety Section in the Kansas City District in 2012. Although currently serving in a supervisory capacity, he remains actively engaged in geotechnical issues locally, regionally, and nationally. Mr. Bellew is approved for 32 different areas of interest in CERCAP, including various foundation and foundation risk assessment categoried.

Civil Design Engineer – Huma Nisar, CESPL-ED – 213-452-3665, Huma.M.Nisar@usace.army.mil. Huma Nisar is a Project Engineer for US Army Corps of Engineers at Los Angeles District. She assumed this position in June 2000. Ms. Nisar has a Bachelor of Science degree in Civil Engineering, from California State University Fullerton. Ms. Nisar has served in team leadership positions in the Civil Works sides of the Corps. She was involved in completing designs for key projects for both Chicago and Los Angeles District. She has extensive experience in levee and floodwall restoration, wetland enhancement, recreation facilities, environmental work and mitigation. From 1994 to 2000 she served with the Chicago District in Civil Design Branch as a Design Engineer. In 2000, Ms. Nisar assumed the Project Engineer position with the Los Angeles District. Prior to joining Corp of Engineers, She worked for McDonough and Associate as a Design Engineer on the Light Rail System for Chicago Area and for AT Curd Builders as a Field Engineer for MGM Grand Hotel project. Ms. Nisar is an approved civil engineering reviewer in CERCAP for earthen embankments, pump stations, and misc. structures.

Real Estate – Jason E. Meyer, CELRL-RE-C – 502-315-6956, Jason.E.Meyer@usace.army.mil. (Bio not available) Jason is an approved real estate reviewer.

Hydraulic Engineering and FRM Analysis – Michael K Deering, IWR-HEC-WRS – 530-756-1104 michael.k.deering@usace.army.mil. Mr. Deering is a registered Professional Engineer in the state of California, has been a practicing engineer since 1978, and has a Bachelors and Masters of Engineering degrees in civil engineering from UC Davis. Work Experience: 6 years - Senior Hydraulic Engineer, Water Resource Systems Division, Institute for Water Resources lead for the development of HEC-WAT with FRA compute option and member of the GUMP team for updating various policy and technical guidance. 2 years - Chief, Water Resource Systems Division IWR-HEC, Leading the Division in the development and application of Flood Damage Reduction, Ecosystem Restoration, and System Analysis software. Project Manager for the Helmand Valley Water Management Plan for Afghanistan. Lead manager for data and modeling project for Iraq. 2 years - Regional Design Team Lead, USDA – NRCS, Serviced four states providing engineering leadership and guidance to a group of design engineers and technicians. 7 years - Chief, Hydraulics/Hydrology Section and Senior Hydraulic Engineer, NWS. Chief, Civil Design Section, SPK provided engineering supervision to a staff of 22 engineers and technicians. 1 year - HEC, Planning Analysis Division –Senior Hydraulic Engineer assisting in the development of the next generation of the HEC-FDA and HEC – FIA. 1 year – Chief, San Joaquin River Section, SPK responsible levee rehabilitation projects associated with the PL84-99 Levee Rehabilitation Program. 13 years – Hydraulic Engineer, SPK – Hydraulic modeling technical expert particularly with multi-dimensional applications. 6 years - Design and Field Office Engineer -USDA– SCS - Flood risk management with risk analysis, impact analysis, ecosystem restoration, river hydraulics, stream stability and scour, surface water hydrology, water surface profile modeling, floodplain delineations, hydraulic structures. Mr. Deering is an approved FRM risk analysis reviewer and was assigned to the ARTR by the Hydrologic Engineering Center.

5. **Charge to Reviewers**. A charge was developed for the ATR of the draft GRR and EIS/EIR. There was no update to the charge for the final GRR and EIS/EIR. The ATRT Lead also discussed the roles and responsibilities with the ATRT members and the PDT. The ATRT Lead's electronic meeting notice to the ATRT provided the location and description of review documents, review schedule, labor codes and

amounts. The notice also identified the DrChecks project and review, and stated the requirement for four part comments. The notice provided schedule updates during the ATR.

6. Summary. The previous Draft ATR and targeted ATR reviews and coordination provided a strong foundation for the Final ATR. The Final ATR was completed without issues or controversy. All 56 comments received were closed to the satisfaction of the ATRT and the PDT.

The following paragraphs summarize the status of comments.

a. Critical. None. There was one comment with high significance regarding slurry wall placement and DSM method. This comment was closed after additional information provided.

b. Unresolved. None.

c. Lessons Learned. None.

7. **Dr. Checks Report**. The DrChecks report of all comments is attached as Enclosure 1.

8. **ATR Completion Statement.** Enclosure 2 contains the ATR completion statement.

Marc L. Masnor, P.E.
CESWF-PEC-PF (Tulsa, OK)
Regional Technical Specialist for Plan Formulation

Enclosure 1

DRCHECKS REPORT OF ALL COMMENTS

Comment Report: All Comments
Project: ARCF - General Reevaluation Report (GRR), TSP & Attachments, American River Common Features (ARCF), California (P2 #149827)
Review: ATR Final EIS/EIR (10-14 Aug 2015)
Displaying 56 comments for the criteria specified in this report.

Id	Discipline	Section/Figure	Page Number	Line Number
6188524	Cost Engineering	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

1. CONCERN: Observation: Some of the comments are based my observation of cost and schedule documents that are in conformance with the cost and schedule requirements. The purpose of these comments is to record the aspects of the cost and schedule documents that have been considered in the review. Your evaluation can be: concur. An evaluation is required in order for the reviewer to close the comment.

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: Observation Comment. No Resolution Required. Include an evaluation that indicates concur or not concur.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **For Information Only**
Observation Comment - FIO - Concur

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 11 2015

1-1 Backcheck Recommendation **Close Comment**
Observation Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 21 2015

Current Comment Status: **Comment Closed**

6188525	Cost Engineering	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

2. CONCERN: Observation. ATR completion could be significantly delayed if additional rounds of backchecks and evaluations are required to get the clarification included in the documents.

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **For Information Only**
Observation Comment - FIO - Concur

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 11 2015

1-1 Backcheck Recommendation **Close Comment**
Observation Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 21 2015

Current Comment Status: **Comment Closed**

6188527	Cost Engineering	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

3. CONCERN: Observation: Estimate Structure
5668 Notes
939 Unique Notes
9082 detail
1540 upper folder
3491 lower folder
19781 Lines of Data

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering

Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: Observation Comment. No Resolution Required. Include an evaluation that indicates concur or not concur.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **For Information Only**
Observation Comment - FIO - Concur

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 11 2015

1-1 Backcheck Recommendation **Close Comment**
Observation Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 21 2015

Current Comment Status: **Comment Closed**

6188529 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

4. CONCERN: Observation: Total Project Cost Summary
Total Project Cost Non Construction Cost Construction Cost
865,835,141 94,347,658 771,487,483 Direct Cost
27,066,458 (0) 27,066,458 Sub CMU
793,553,939 (1) 793,553,940 Cost To Prime
247,134,031 0 247,134,031 Prime CMU
1,140,035,631 94,347,659 1,045,687,971 Contract Cost

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: Observation Comment. No Resolution Required. Include an evaluation that indicates concur or not concur.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **For Information Only**
Observation Comment - FIO - Concur

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 11 2015

1-1 Backcheck Recommendation **Close Comment**
Observation Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 21 2015

Current Comment Status: **Comment Closed**

6188530 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

5. CONCERN: Observation: Direct Cost Overrides
$ % of Labor, Equip, Material % of Total Direct Construction
M 630 19,573,323 10.74% 3% 630 MATERIAL Overrides, $19,573,323, 10.74% of Direct Construction Matl, 2.54% of Direct Construction Cost

N 5963 461,442,925 60% 5963 NO Overrides, $461,442,925, 59.81% of Direct Construction Cost

E 499 2,652,620 1.09% 0.34% 499 EQUIPMENT Overrides, $2,652,620, 1.09% of Direct Construction Equipment, 0.34% of Direct Construction Cost

O 2077 278,511,021 36.10% 2077 OUTPUT Overrides, $278,511,021, 36.1% of Direct Construction Cost

L 493 145,271 0.06% 0.02% 493 LABOR Overrides, $145,271, 0.06% of Direct Construction Labor, 0.02% of Direct Construction Cost

Sb 243 10,251,716 1.33% 243 SUB BID Overrides, $10,251,716, 1.33% of Direct Construction Cost

Total 3942 311,133,951 40.33% 3942 TOTAL Overrides, $311,133,951, 40.33% of Direct Construction Cost

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: Observation Comment. No Resolution Required. Include an evaluation that indicates concur or not concur.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **For Information Only**
Observation Comment - FIO - Concur

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 11 2015

1-1 Backcheck Recommendation **Close Comment**
Observation Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 21 2015

Current Comment Status: **Comment Closed**

6188531 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

6. CONCERN: Observation: Direct Construction Cost Summary
243,303,759 31.5% Direct Construction Labor $243,303,759, 31.54% of Direct Construction Cost
244,101,024 31.6% Direct Construction Equipment $244,101,024, 31.64% of Direct Construction Cost
487,404,783 63.2% Direct Construction Labor + Equipment $487,404,783, 63.18% of Direct Construction Cost
182,199,187 23.6% Direct Construction Matl $182,199,187, 23.62% of Direct Construction Cost
69,954,926 9.1% Direct Construction Sub Bid $69,954,926, 9.07% of Direct Construction Cost
31,928,588 4.1% Direct Construction User $31,928,588, 4.14% of Direct Construction Cost
771,487,484 100% Direct Construction Cost

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: Observation Comment. No Resolution Required. Include an evaluation that indicates concur or not concur.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **For Information Only**
Observation Comment - FIO - Concur

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 11 2015

1-1 Backcheck Recommendation **Close Comment**
Observation Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 21 2015

Current Comment Status: **Comment Closed**

6188533 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

7. CONCERN: Observation: : 90% Direct Cost Productivity markup. The basis for this markup is explained in the cost appendix "Normal Productivity/Task Durations are based on production for 50 minutes/hr to allow for meetings/breaks, accessing the working area/office trailer to get supplies, etc. Because overtime is expected to go on for months, productivity is reduced to 90% of normal."
BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: Observation Comment. No Resolution Required. Include an evaluation that indicates concur or not concur.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **For Information Only**
Observation Comment - FIO - Concur

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 11 2015

1-1 Backcheck Recommendation **Close Comment**
Observation Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 21 2015

Current Comment Status: **Comment Closed**

6188537 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

8. CONCERN: Each of the prime contractors has a folder that includes JOOH items that could be used to included a calculated JOOH. In fact these calculated JOOH costs are not included in the estimate. Please verify that it is intended to NOT include the calculated JOOH in the estimate. Then, consider deleting these calculated JPOOH costs from the contractor to avoid this comment in the future.

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **Concurred**

Concur - It IS intended to NOT include calculated JOOH in the estimate.
In the past, when there are many reaches, the Cost Engineer has sometimes done detailed JOOH for several reaches, then changed to an average. Contractors with the detailed JOOH markups (that typically automatically shows a markup for small tools and with Direct % based on items in the Overhead List folder) can easily be changed to JOOH with a Running %. I believe the opposite is not true. A new contractor needs to be created, a JOOH list added, and all tasks reassigned. If it was possible to omit the Overhead List folder from this 'detailed JOOH' contractor when wanting to 'override' with a Running % markup, I would do so. That would appear cleaner.
I'll note this for the future, but I still believe it easier to use a 'dummy' detailed JOOH contractor, where I'm actually using a Direct % markup for the feasibility study. Then, when preparing PED estimates I can change quickly to the detailed JOOH contractor and revise/update the Overhead List items to reflect the actual contract. My primary preference doing this is that I don't have to reassign tasks.
I hope I explain this clearly.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 11 2015

1-1 Backcheck Recommendation **Close Comment**

Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 24 2015

Current Comment Status: **Comment Closed**

6188538	Cost Engineering	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

9. CONCERN: There are 10 different detail items totaling $99,347,660 that have no contractor assigned to them or to any folder above them. That is why the total direct cost $865,835,141 is greater than the Cost to Prime $793,553,939. I suggest that an additional contractor layer be added at the top, Project Contractor with no markups, to capture these costs in the cost to prime. The items with no contractor assigned include:

DESCRIPTION DIRECT COST FREQUENCY
detail Riparian Mitigation - for LS Construction Improvements 30,922,200 9
detail Fish Monitoring 24,500,000 12
detail Riparian Mitigation - for WS Construction Improvements 16,854,200 8
detail Riparian Mitigation - for Rock Trench Erosion Control 14,579,400 8
detail Mitigation for Elderberries 6,375,000 8
detail Loss of RR Service 5,000,000 1
detail Riparian Mitigation - for SWIF Constr Improvements 558,360 2
detail Mitigation for Vernal Pools 300,000 1
detail Non-Riparian Mitigation - for Veg Removal 206,800 6
detail Non-Riparian Mitigation - for SWIF Constr Improvements 51,700 1

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **Concurred**

All items described above (and all items with no contractor assigned) have been assigned to 'Prime Contractor NO MARKUPS.' The total direct cost is no longer greater than the Cost to Prime.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 11 2015

1-1 Backcheck Recommendation **Close Comment**
Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 24 2015

Current Comment Status: **Comment Closed**

6188539 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

10. CONCERN: The total amount of work assigned to a subcontractor may not be high enough at a direct cost = 82,073,465, 10.64% of the direct construction cost $ 771,487,483 . For this project, I would expect to see 25% to 50% of the work assigned to a subcontractor. It is likely that Slurry Wall Placement, DSM Method would be subcontracted and this alone is $103,705,497, 13% of the direct cost. It is possible that all or most of the hauling could be sub contracted at a cost of 67,574,638 or 9% of the direct construction cost. It is likely that acquisition strategy would require more sub contract work. Please consider what would likely be subcontracted and adjust the contractor assignments.

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **Concurred**
Use of subcontractors have been re-examined. In general, cutoff wall placement (slurry or DSM) is assumed to be subcontracted. Hauling had reflected (and continues to reflect) use of a Trucking 'Broker' (basically already a sub). Notes have been added to the top folder of each reach to more clearly show subcontractor use and also to state that Bank Stabilization is assumed to be a separate contract from Levee Improvements and Relocations.
NOTE that use of subs for Alt 2 includes other changes as well. The portion of the work for widening the bypass is very similar to Levee Improvements and another contractor has been added to reflect this.
The prime contractor for the new Weir and Bridge has been renamed and modified to reflect concrete work for the structure with subs for the bridge (steel struct, 2nd tier sub for bridge painting) plus a miscellaneous sub for earthwork, relocations, and removal of existing rail line.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 11 2015

1-1 Backcheck Recommendation **Open Comment**
Please provide revised documents for verification. Comment remains open.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 02 2015

1-2 Backcheck Recommendation **Close Comment**
Documents provided. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 10 2015

Current Comment Status: **Comment Closed**

6188540 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

11. CONCERN: Filename ARCF_GRR-Feas_Report_Cost_Engr_Appendix-20150511.docx indicates "In general, a prime contractor for projects of over $10-12M (considered large business) has profit set at 8.48% based on PWG. Home Office Overhead is considered to be 7% for the Prime's own work..."

28 Prime Contractor has a direct cost = 87,743,041 and a HOOH = 10%. Verify if this should be changed to 7%

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **Concurred**
HOOH for prime contractor of extended weir has been left at 10% per comment 6188555.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 17 2015

1-1 Backcheck Recommendation **Close Comment**
Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 24 2015

Current Comment Status: **Comment Closed**

6188544 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

CONCERN: Filename ARCF_GRR-Feas_Report_Cost_Engr_Appendix-20150511.docx indicates "In general, a prime contractor for projects of over $10-12M (considered large business) has profit set at 8.48% ...".It appears that the profit is actually 10.00% or 10.01%. Please verify if the profit should be 8.48% or 10.00% and adjust so the appendix matches the estimate.

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **Concurred**
PWG have been applied for each contractor/reach as suggested per comment 6188551 (using spreadsheets being sent as part of Backcheck Submittal). CE Appendix is updated to reflect the various PWG ranges.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 17 2015

1-1 Backcheck Recommendation **Close Comment**
Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 24 2015

Current Comment Status: **Comment Closed**

6188546 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

13. CONCERN: Filename ARCF_GRR-Feas_Report_Cost_Engr_Appendix-20150511.docx indicates " Job/Field Office Overhead (JOOH) is also set at 15% for small businesses and 10% for SubWork". It is not clear what is meant by 15% for small businesses and 10% for SubWork. Is this referring to a small business prime contractor markup on own work 15% and small business prime contractor markup on sub work 10%? Please clarify and reconcile with the estimate markups.

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **Concurred**
It is believed that the markups by a small business for JOOH will be greater than those for large business, so these are set at 15% rather than 10%. After discussions with our RTS, markups for JOOH and HOOH previously indicated as prime markup on subcontractor's work have been removed. It is expected that the subs for this project will provide for their own JOOH and no HOOH markup by the prime for subcontractors is believed needed either. The ATR reviewer will be provided a spreadsheet of markups for all contractors and subs for clarification. Cost Engineering Appendix is updated to reflect the new markups.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 17 2015

1-1 Backcheck Recommendation **Open Comment**
Please provide revised MII for verification. Comment remains open.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 02 2015

1-2 Backcheck Recommendation **Close Comment**
Documents provided. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 10 2015

Current Comment Status: **Comment Closed**

6188550 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

14. CONCERN: The estimate is set up with a separate prime and sub contractor for each reach. Subcontractor markups are consistent at 15.00% 10.00% 10.00% 1.20% for JOOH HOOH Profit Bond. Prime contractor markups on sub work are consistent at 10.00% 10.010% 1.200% for JOOH_PRM Profit_PRM Bond_PRM. However Prime markup on sub work for HOOH is either 5% or 10%. Please explain this inconsistence in the prime contractor markup on sub work and reconsile with Filename ARCF_GRR-Feas_Report_Cost_Engr_Appendix-20150511.docx indicates "Home Office Overhead is considered to be 7% for the Prime's own work and 5% for SubWork for these relatively large projects. " and "In general, a prime contractor for projects of under $10-12M is considered small business and has profit set at 10%. Home Office Overhead is considered to be 15% for the Prime's own work and 10% for SubWork."

Description HOOH_PRM
2.2 Sub Misc Reach A, ARS 5.00%
4.2 Sub Misc Reach B, ARS 5.00%
6.2 Sub Misc Reach C, ARS 5.00%
8.2 Sub Misc Reach D, ARS 5.00%
10.2 Sub Misc Reach E, ARS 5.00%
12.2 Sub Misc Reach F, ARS 5.00%
14.2 Sub Misc Reach G, ARS 5.00%
16.2 Sub Misc Reach A, ARN 5.00%
18.2 Sub Misc Reach B, ARN 10.00%
20.2 Sub Misc Reach C, ARN 10.00%
21.2 Sub Misc Reach D, ARN 5.00%
22.2 Sub Misc Reach E, ARN 5.00%
23.2 Sub Misc Reach F, ARN 5.00%
24.2 Sub Misc Reach G, ARN 10.00%
26.2 Sub Misc Reach I, ARN 10.00%

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **Concurred**
After discussions with our RTS, markups for JOOH and HOOH previously indicated as prime markup on subcontractor's work have been removed. It is expected that the subs for this project will provide for their own JOOH and no HOOH markup by the prime for subcontractors is believed needed either. The ATR reviewer will be provided a spreadsheet of markups for all contractors and subs for clarification. Cost Engineering Appendix is updated to reflect the new markups.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 17 2015

1-1 Backcheck Recommendation **Open Comment**
Please provide revised MII for verification. Comment remains open.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 02 2015

1-2 Backcheck Recommendation **Close Comment**
Documents provided. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 10 2015

Current Comment Status: **Comment Closed**

6188551	Cost Engineering	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

15. CONCERN: Prime Contractor profit on subcontractor work is based on the same WPG for each reach with the resultant same profit. The profit % from the WPG is dependent on the contract amount, period of performance and level of subcontracting. These factors are different for each reach. Please address this assumption in the cost appendix.

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **Concurred**
As suggested, PWG have been computed for all contractors/subcontractors for each reach based on Contract amount, duration, subcontracting, etc. Spreadsheet calculations for each PWG are being sent to the ATR reviewer as part of the backcheck submittal. This has also been explained further in the Cost Engr Appendix.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 17 2015

1-1 Backcheck Recommendation **Close Comment**
Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 24 2015

Current Comment Status: **Comment Closed**

6188554	Cost Engineering	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

16. CONCERN: Filename ARCF_GRR-Feas_Report_Cost_Engr_Appendix-20150511.docx. Several cost appendix references appear to conflict with the estimate documents as noted in "":

CONTRACTING PLAN Subcontractors are provided for two categories, miscellaneous/general and "bank stabilization from the waterside". Miscellaneous/General Subcontractors are expected to be utilized for hydroseeding, geotextile, vibration monitoring and paving. Bank stabilization from the waterside subcontractors are not applied in the estimate. Please clarify.

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **Concurred**
After discussions with our Cost Engineering RTS for Civil Works, is is believed that the Prime Contractor for Bank Stabilization will do most of the work for bank protection (sans reveg and vibration monitoring).
For clarity, all subs not used have been delete. Typically only one misc sub is indicated, except for the Sac Weir Extension in widening the Sac Bypass. Notes have been added to the top folder in each reach to provide clarification.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 17 2015

1-1 Backcheck Recommendation **Close Comment**
Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 24 2015

Current Comment Status: **Comment Closed**

6188555	Cost Engineering	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

17. CONCERN: It is my opinion that Prime Contractor 7% HOOH and 10% JOOH on own work is not high enough to capture all costs. These rates are applied to the larger projects and to be understated could result in significant understated total costs. I suggest that these rates be increased to 10% and 13% based on experience with similar projects.

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **Concurred**
Markups for all primes have been increased to 13% for JOOH. HOOH for most contracts (considered big business) have been increased to 10%. HOOH for small business is believed to have a somewhat higher HOOH markup (15%).

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 17 2015

1-1 Backcheck Recommendation **Close Comment**
Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 24 2015

Current Comment Status: **Comment Closed**

6188557 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

18. CONCERN: SPK - American River Common Features - CSRA - 2015-07-06 DRAFT - ALT 1 (NED).xlsm and other csra files. Cost Risk Model tab
TL5 Design Criteria and Assumptions low = $38,576,400
TL7 Vegetation Variance low = $43,712,400

Normally low values are negative indicating a possible cost savings. Please explain why these 2 low values are not negative. And then why the most likely is not between the low and the high

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **Concurred**
Risk TL5 and TL7 are modeled as a potential range of costs with a probability of occurrence. For example, Risk TL7 models the Very Unlikely chance that vegetation removal will be required. The probability of occurrence is 5% and if that vegetation removal is required costs could range anywhere from $43.7M to $72.8M.
(evaluation by William Bolte, NWW, 509-527-7585; Bill developed CSRA results)

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 17 2015

1-1 Backcheck Recommendation **Close Comment**
Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 24 2015

Current Comment Status: **Comment Closed**

6188558 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

19. CONCERN: SPK - American River Common Features - CSRA - 2015-07-06 DRAFT - ALT 1 (NED).xlsm and other csra files. Cost Risk Model tab. Please explain why the assumption parameters are set at custom 20% and 80% instead of Min Most Likely Max and why the parameters are not based on the Low Most Likely and High from the cost model

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **Concurred**
Assumptions were modeled at 20%, most likely and 80% data points which gives a higher resulting contingency then modeling the same numbers at Min, Most Likely and Max. Trying to define the tails is difficult to impossible, true worst case is infinity. The logic behind modeling at 20/mostlikely/80 is because we use the 80% confidence for our funding request. It's also a number we conceptually can understand. At the time this was originally modeled we then also would model the low as a 20% confidence for symmetry. But only recently, upon closer inspection, modeling $0 impacts at 20% confidence would result in risks with potential negative costs (savings) at the 0% confidence, which isn't possible. So we've now started modeling the lower bound as a minimum cost. I've updated this model to reflect a Minimum/Most Likely/80% cost distribution. The most likely costs have remained unchanged. Changing the lower parameter from 20% to minimum increased overall project contingency some 7%.
(evaluation by William Bolte, NWW, 509-527-7585; Bill developed CSRA results)

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 17 2015

1-1 Backcheck Recommendation **Close Comment**
Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 24 2015

Current Comment Status: **Comment Closed**

6188562 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

20. CONCERN: SPK - American River Common Features - CSRA - 2015-07-06 DRAFT - ALT 1 (NED).xlsm and other csra files. Cost Risk Model tab. ESTIMATE AND SCHEDULE RISKS

Estimate Assumptions and Quantities should be broken out into Estimate Assumptions, and Quantities .

Given the pdt discussion "No PED level survey is available. No specific designs/quantities based on surveyed cross sections has been developed, it does not seem reasonable to build a quantity opportunity into the model at this time.

Add a risk for modifications due to design changes as a worst case maybe 15% applied to all construction features

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **Concurred**
Variations in Quantities are modeled under Risk ET1 - Quantities and Estimate Assumptions are handled in Risk ET6 - Level of Estimate. As for the potential reductions in quantities that were modeled, quantities are thought to be conservative. As stated in the justifications of potential project impacts "Earthwork cross sections were developed in primarily 5 foot intervals, with no interpellations. Quantities were always rounded up to next larger typical cross section."
(evaluation by William Bolte, NWW, 509-527-7585; Bill developed CSRA results)

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 17 2015

1-1 Backcheck Recommendation **Close Comment**
Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 24 2015

Current Comment Status: **Comment Closed**

6188563	Cost Engineering	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

21. CONCERN: SPK - American River Common Features - CSRA - 2015-07-06 DRAFT - ALT 1 (NED).xlsm and other csra files. Cost Risk Model tab. CONSTRUCTION RISKS
Differing Site Conditions at 3% of Levees & Floodwalls and Bank Stabilization is not sufficient. Consider a much higher percentage as a worst case maybe 15% applied to all construction features

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements

SIGNIFICANCE: Medium

RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

1-0 Evaluation **Concurred**
Risk CO1 has been renamed Modifications and Claims to be more all encompassing. Risk has now been modeled with most likely defined as an increase of 3% of construction cost and 80% as a 5% increase in construction cost. Overall project contingency increased some 1%.
(evaluation by William Bolte, NWW, 509-527-7585; Bill developed CSRA results)

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 17 2015

1-1 Backcheck Recommendation **Close Comment**
Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 24 2015

Current Comment Status: **Comment Closed**

6188565	Cost Engineering	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

22. The following 2 folder items include riprap purchase as detail items,. The material unit prices are 23.33 TON and 32.55 ton. It seems like the material price would be the same. Please explain why these material prices are not the same

22.1. lower folder Riprap (Rock Slope Protection) (EP) , 1,483,116 TON @ $47 per TON = $69,672,096, 9% of the estimated direct construction cost, used 5 times in the estimate, overrides = 0 23.33 TON

22.1.1. detail Riprap Placement (Work Cond - Average) , 1,483,116 TON @ $29 per TON = $43,339,374, 6% of the estimated direct construction cost, used 5 times in the estimate, overrides = 1 5.89 placement, 23.33 material

22.1.2. detail Hauling (TN), from commercial source or borrow site (20 CY end dumps) , 1,483,116 TON @ $18 per TON = $26,332,723, 3% of the estimated direct construction cost, used 5 times in the estimate, overrides = 1

22.2. upper folder Rip Rap (Waterside Placement) , 1,280,294 TON @ $48 per TON = $61,850,376, 8% of the estimated direct construction cost, used 4 times in the estimate, overrides = 0 15.76 32.55 ton

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 07 2015

Revised Aug 07 2015.

1-0 Evaluation **Non-concurred**
Riprap is anticipated to come from different suppliers/quarries dependent on waterside vs landside placement. The material price for riprap per these suppliers ARE NOT the same.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 21 2015

1-1 Backcheck Recommendation **Close Comment**
Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Aug 24 2015

Current Comment Status: **Comment Closed**

6197434	Risk Assessment	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Discussed updated report materials for the risk assessment/analysis with PDT member. PDT member responsible for executing the risk assessment and documenting the risk analysis stated that the applied procedure and the report language are essentially the same as in the previous version thus no further comments are provided here.

Submitted By: Michael Deering (5307561104). Submitted On: Aug 14 2015

1-0 Evaluation **Concurred**
Concur with Comment.

Submitted By: Sara Schultz ((916) 557-7368) Submitted On: Sep 04 2015

1-1 Backcheck Recommendation **Close Comment**
Concur with evaluation

Submitted By: Michael Deering (5307561104) Submitted On: Sep 08 2015

Current Comment Status: **Comment Closed**

6198478	Cultural Resources	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

No Comment.
I have reviewed Section 3.9 Cultural Resources, Section 4.2.5, and the appropriate cultural resources portions of Sections 5.0 and 6.2 of the Admin_FINAL_ARCF_GRR_EISEIR_13Aug15.docx and have No further Dr.Cks. comments.
I have coordinated with the cultural resources PDT contact and provided some small editorial type comments/recommendations for clarification purposes.

Submitted By: Gregory Everhart (505-342-3352). Submitted On: Aug 14 2015

1-0 Evaluation **Concurred**
Concur with comment. Thank you for your review.

Submitted By: Sara Schultz ((916) 557-7368) Submitted On: Sep 04 2015

1-1 Backcheck Recommendation **Close Comment**
Comment closed.

Submitted By: Gregory Everhart (505-342-3352) Submitted On: Sep 09 2015

Current Comment Status: **Comment Closed**

6200594	Real Estate	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

The Real Estate Plan (REP) dated August 2015 that is to accompany the ARCF GRR has been reviewed. No further Real Estate comments are warranted at this stage of the planning procees. Additional review should take place during/after the PED phase or as revisions to the REP occur.

Submitted By: Jason Meyer (502-315-6956). Submitted On: Aug 17 2015

1-0 Evaluation **Concurred**
Concur with the comment. Thanks for your review.

Submitted By: Sara Schultz ((916) 557-7368) Submitted On: Sep 04 2015

1-1 Backcheck Recommendation **Close Comment**
Comment closed.

Submitted By: Jason Meyer (502-315-6956) Submitted On: Sep 08 2015

Current Comment Status: **Comment Closed**

6207088 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

23. CONCERN: Significant Detail Items: Labor, Equipment, Materials, detail Slurry Wall Placement, DSM Method
13% detail Slurry Wall Placement, DSM Method , 35,490 HR @ $2,922 per HR = $103,705,497, 13% of the estimated direct construction cost, used 28 times in the estimate, overrides = 1
Direct unit cost at 2,922 per hour is consistent across all applications.
I reviewed the work analysis indicated in a folder 2 levels up at 5.2.17.3 Cutoff Wall, DSM, 3' wide, 105 ft deep. This is the most expensive Slurry wall. The work analysis indicates that the number of panels is determined by dividing the wall length by the panel width to arrive at 874 panels.
Length of Wall 3,500.00 LF
Number of Wall Panals 874.00 EA
Panel Length 4.00 FT
Deep soil mixing is done with augers. If the wall width is 3 ft a 3 ft auger would be used. Overlaps would be significant, reducing the effective panel length to 2.4 ft.
My concern is that the wall is to be 3 ft wide and with panel overlaps, the effective panel width may be 2.4 ft wide requiring 1458 panels.
Width of Wall 3.00 FT
Overlap 80%
Effective Width 2.40 FT
Number of Wall Panels Required 1,458.33 EA
If this is correct, when applied to all the walls, costs could increase significantly.
Please verify the effective panel width.
BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements
SIGNIFICANCE: High
RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
In a project recently constructed by SPK (Marysville Ring Levee), a 3-auger rig was utilized with an effective panel width of 4 ft (7 ft total width of panel with 3 ft overlap). This was assumed here. Cost engineer consulted Geotech Engineer on placement rate of panels and DSM cost in estimate is typically about $24-$25/SF. DQC cmt 17 has indicated wall price is consistent with what SPK has been seeing.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 31 2015

1-1 Backcheck Recommendation **Open Comment**
Please include the evaluation information in MII. Please provide revised MII for verification. Comment remains open.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 02 2015

1-2 Backcheck Recommendation **Close Comment**
Documents provided. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 10 2015

Current Comment Status: **Comment Closed**

6207091 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

24. CONCERN: Significant Detail Items: Labor, Equipment, Materials, detail Slurry Wall Placement, DSM Method , 35,490 HR @ $2,922 per HR = $103,705,497, 13% of the estimated direct construction cost, used 28 times in the estimate, overrides = 1
I suggest that a quote for this work be obtained to verify the estimated costs. Several DSM contractors will be willing to discuss this project and offer their opinion of costs.
BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements
SIGNIFICANCE: Medium
RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to

the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 21 2015

1-0 Evaluation **Non-concurred**
It is the experience of SPK Cost Engineering that quotes at feasibility stage are wide ranging with great uncertainty as contractors will not take the time to provide a detailed quote when no reasonable prospect of getting the work since on average the first construction projects are 4 to 6 years away.
DQC cmt 17 has indicated wall price is consistent with what SPK has been seeing in the last year or two. Cost engineer consulted Geotech Engineer on placement rate of panels and DSM cost in estimate is typically about $24-$25/SF. Geotech Engineer who often works in the field has verbally stated that upper limit for unit cost should be no more than $25/SF.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 31 2015

1-1 Backcheck Recommendation **Close Comment**
Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 02 2015

Current Comment Status: **Comment Closed**

6207097 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

25. CONCERN: Significant Detail Items: Labor, Equipment, Materials, detail Slurry Wall Placement, DSM Method
13% detail Slurry Wall Placement, DSM Method , 35,490 HR @ $2,922 per HR = $103,705,497, 13% of the estimated direct construction cost, used 28 times in the estimate, overrides = 1
Notes indicate: "This is specialized construction. If cutoff wall construction is the major work, this job will be bid by a Prime Contractor. If cutoff wall construction is mixed in with other construction work, the cutoff wall construction will be subcontracted out, and the cost should include mob and demob."
I suggest that this work be included in the estimate as a subcontracted cost.
BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements
SIGNIFICANCE: Medium
RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
DSM slurry walls have been made a subcontracted cost in the revised estimates.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 31 2015

1-1 Backcheck Recommendation **Open Comment**
Please provide revised MII for verification. Comment remains open.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 02 2015

1-2 Backcheck Recommendation **Close Comment**
Documents Received. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 10 2015

Current Comment Status: **Comment Closed**

6207098 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

26. CONCERN: Significant Material Items: The following significant detail material items lack notes to support the costs.
detail Rip Rap , 1,280,294 TON @ $32.55 per TON = $41,673,570, 23% of the estimated direct Material Construction Cost, 5% of the estimated total Direct Construction Cost, used 4 times in the estimate, overrides = 0 Cost supported by note : "(Note: Price from San Rafael Quarry)". Quotes should include the source contact information, date, amount, and conditions such as includes sales tax, includes delivery, excludes loading.
detail Riprap Placement (Work Cond - Average) , 1,483,116 TON @ $23.33 per TON = $34,597,389, 19% of the estimated direct Material Construction Cost, 4% of the estimated total Direct Construction Cost, used 5 times in the estimate, overrides = 0 There are no notes to support the material cost for this material.
detail Borrow Site Loading , 2,222,787 LCY @ $7.4 per LCY = $16,447,960, 9% of the estimated direct Material Construction Cost, 2% of the estimated total Direct Construction Cost, used 47 times in the estimate, overrides = 0 There are no notes to support the material cost for this material.

BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements
SIGNIFICANCE: Medium
RESOLUTION: Please obtain material quotes that include the source contact information, date, amount, and conditions such as includes sales tax, includes delivery, excludes loading. If quotes is more than 2 years old, a new quote should be obtained.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
Notes have been added to reflect riprap costs from the likely supplier for waterside placement and a possible supplier for landside placement.

For borrow, assumes material costs for developing any borrow site result in similar costs to that of purchase at a supplier.

A Central Valley supplier has indicated $7.17/TN for fill and engineered fill. Notes have been added to the estimate to reflect this. It is assumed that 1 LCY of fill ~1.1 TN. Unit Cost for 1 LCY is set at $7.90.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 31 2015

1-1 Backcheck Recommendation **Open Comment**
Please provide revised MII for verification. Comment remains open.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 02 2015

1-2 Backcheck Recommendation **Close Comment**
Documents Received. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 10 2015

Current Comment Status: **Comment Closed**

6207099 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

27. CONCERN: Notes for the following items refer to ProdQuant WORKSHEETS
BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements
SIGNIFICANCE: Medium
RESOLUTION: Please provide the cited document
27.1. Significant Labor and Equipment Items: detail Levee Excavation , 3,588,117 BCY @ $10.2 per BCY = $36,595,442, 8% of the estimated direct Labor and Equipment Construction Cost, 5% of the estimated total direct construction cost, used 156 times in the estimate, overrides = 0
27.2. Significant Labor and Equipment Items: detail Random Levee Material Placement, Shaping, and Compaction, Sheepsfoot , 2,618,609 ECY @ $11.64 per ECY = $30,475,505, 6% of the estimated direct Labor and Equipment Construction Cost, 4% of the estimated total direct construction cost, used 167 times in the estimate, overrides = 0

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
Production Quantity Excel spreadsheet will be provided with backcheck submittal.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 31 2015

1-1 Backcheck Recommendation **Open Comment**
Please provide revised documents for verification. Comment remains open.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 02 2015

1-2 Backcheck Recommendation **Close Comment**
Documents Received. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 10 2015

Current Comment Status: **Comment Closed**

6207100 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

28. CONCERN: Significant Labor and Equipment Items: detail Disposal of non compliant material , 2,653,337 LCY @ $10.64 per LCY = $28,233,443, 6% of the estimated direct Labor and Equipment Construction Cost, 4% of the estimated total direct construction cost, used 101 times in the estimate, overrides = 0
Direct Cost unit price varies from $16 to $0.12 per LCY. 5 of the 101 instances refer to (Note: for Haul Rate (Crew Output), see ProdQuant WORKSHEETS.xls)
BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements
SIGNIFICANCE: Medium
RESOLUTION: Please provide the cited document and recheck the unit price development

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
Unit Price development has been checked and Production Rate spreadsheet will be provided with backcheck submittal. Notes have been added at the folder levels reflecting the spreadsheet calculations.

Unit costs DO vary widely, primarily due to variations in cycle time and assumed minimum placement time. The various reaches in this project vary quite a bit when it comes to accessibility. For small quantities, such as at utility relocations, one hour has basically been used as the minimum placement time, even for very small loads (less than 1 full load).

The $0.12 was a bust and has been fixed.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 31 2015

1-1 Backcheck Recommendation **Open Comment**
Please provide revised MII for verification. Comment remains open.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 02 2015

1-2 Backcheck Recommendation **Close Comment**
Documents Received. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 10 2015

Current Comment Status: **Comment Closed**

6207101	Cost Engineering	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

29. CONCERN: Significant Labor and Equipment Items: detail Hauling (TN), from commercial source or borrow site (20 CY end dumps) , 1,483,116 TON @ $17.75 per TON = $26,332,723, 5% of the estimated direct Labor and Equipment Construction Cost, 3% of the estimated total direct construction cost, used 5 times in the estimate, overrides = 0
No notes to document crew and production rate development
BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements
SIGNIFICANCE: Medium
RESOLUTION: Please provide notes to document crew and production rate development

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
Unit Price development has been checked and Production Rate spreadsheet will be provided with backcheck submittal. Notes have been added at the folder levels reflecting the spreadsheet calculations.

The various reaches in this project vary quite a bit when it comes to accessibility and therefore, cycle time/haul time.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 31 2015

1-1 Backcheck Recommendation **Open Comment**
Please provide revised documents for verification. Comment remains open.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 02 2015

1-2 Backcheck Recommendation **Close Comment**
Documents Received. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 10 2015

Current Comment Status: **Comment Closed**

6207102	Cost Engineering	n/a	n/a	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

30. Significant Labor and Equipment Items: detail Delivery of Levee Material from Borrow Site , 2,222,787 LCY @ $11.7 per LCY = $26,009,756, 5% of the estimated direct Labor and Equipment Construction Cost, 3% of the estimated total direct construction cost, used 47 times in the estimate, overrides = 0
Direct Cost unit price varies from $16 to $10 per LCY. Some instances include note "(Note: for Haul Rate (Crew Output), see ProdQuant WORKSHEETS.xls)
BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements
SIGNIFICANCE: Medium
RESOLUTION: Please provide the cited document and recheck the unit price development

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
Unit Price development has been checked and Production Rate spreadsheet will be provided with backcheck submittal. Notes have been added at the folder levels reflecting the spreadsheet calculations. The notes in the CSI tasks relative to 'Note: for Haul Rate...' have typically been deleted.

Unit costs DO vary widely, primarily due to variations in cycle time and assumed minimum placement time. The various reaches in this project vary quite a bit when it comes to accessibility. For small quantities, such as at utility relocations, one hour has basically been used as the minimum placement time, even for very small loads (less than 1 full load).

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 31 2015

1-1 Backcheck Recommendation **Open Comment**
Please provide revised documents for verification. Comment remains open.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 02 2015

1-2 Backcheck Recommendation **Close Comment**
Documents Received. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 10 2015

Current Comment Status: **Comment Closed**

6207104 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

31. CONCERN: Significant Sub Bid Items: 94,347,660, 12% of the total direct cost consist of non construction items listed below. Notes included in the estimate are not very helpful in supporting the costs.
BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements
SIGNIFICANCE: Medium
RESOLUTION: Please include a paragraph in the cost appendix discussing the source and development of these costs. Reference other documents for support.
31.1. detail Riparian Mitigation - for LS Construction Improvements , 184 ACR @ $168,055.43 per ACR = $30,922,200, 44% of the estimated direct Sub Bid Construction Cost, 114% of the estimated total Direct Construction Cost, used 9 times in the estimate, overrides = 1
31.2. detail Fish Monitoring , 21 EA @ $1,166,666.67 per EA = $24,500,000, 35% of the estimated direct Sub Bid Construction Cost, 91% of the estimated total Direct Construction Cost, used 12 times in the estimate, overrides = 1
31.3. detail Riparian Mitigation - for WS Construction Improvements , 163 ACR @ $103,400. per ACR = $16,854,200, 24% of the estimated direct Sub Bid Construction Cost, 62% of the estimated total Direct Construction Cost, used 8 times in the estimate, overrides = 1
31.4. detail Riparian Mitigation - for Rock Trench Erosion Control , 141 ACR @ $103,400. per ACR = $14,579,400, 21% of the estimated direct Sub Bid Construction Cost, 54% of the estimated total Direct Construction Cost, used 8 times in the estimate, overrides = 1
31.5. detail Mitigation for Elderberries , 75 ACR @ $85,000. per ACR = $6,375,000, 9% of the estimated direct Sub Bid Construction Cost, 24% of the estimated total Direct Construction Cost, used 8 times in the estimate, overrides = 1
31.6. detail Riparian Mitigation - for SWIF Constr Improvements , 5 ACR @ $103,400. per ACR = $558,360, 1% of the estimated direct Sub Bid Construction Cost, 2% of the estimated total Direct Construction Cost, used 2 times in the estimate, overrides = 1
31.7. detail Mitigation for Vernal Pools , 1 ACR @ $300,000. per ACR = $300,000, 0% of the estimated direct Sub Bid Construction Cost, 1% of the estimated total Direct Construction Cost, used 1 times in the estimate, overrides = 1
31.8. detail Non-Riparian Mitigation - for Veg Removal , 2 ACR @ $104,444.45 per ACR = $206,800, 0% of the estimated direct Sub Bid Construction Cost, 1% of the estimated total Direct Construction Cost, used 6 times in the estimate, overrides = 1
31.9. detail Non-Riparian Mitigation - for SWIF Constr Improvements , 1 ACR @ $103,400. per ACR = $51,700, 0% of the estimated direct Sub Bid Construction Cost, 0% of the estimated total Direct Construction Cost, used 1 times in the estimate, overrides = 1

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
Language has been added to the Cost Engineering Appendix explaining the process under which the mitigation costs were estimated. The write ups include references to the documents that support/justify the mitigation cost esimates, including the Biological Opinions, Mitigation and Monitoring Plan, and the Cost Effectiveness/Incremental Cost Analysis.

Submitted By: Anne Baker ((916) 557-7277) Submitted On: Sep 03 2015

1-1 Backcheck Recommendation **Close Comment**
ATR lead has asked for this comment to be closed. Revised documentation has not been provided so that the comment evaluation can be verified. Since the comment is for additional cost support and not a change to the cost, the comment will be closed.
Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 07 2015

Current Comment Status: **Comment Closed**

6207105 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

32. CONCERN: Significant Sub Bid Costs, Quote lacks detail or does not exist, , and including this material cost as a sub bid item causes the sales tax to be not applied.
BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements
SIGNIFICANCE: Medium
RESOLUTION: Please obtain material quotes that include the source contact information, date, amount, and conditions such as includes sales tax, includes delivery, excludes loading. If quotes is more than 2 years old, a new quote should be obtained. Please include these costs a s material costs so that the appropriate sales tax is applied.
32.1. detail Cement , 129,559 TON @ $110.67 per TON = $14,338,295, 20% of the estimated direct Sub Bid Construction Cost, 2% of the estimated total Direct Construction Cost, used 57 times in the estimate, overrides = 1
32.2. detail Fiber Rolls , 2,634,050 LF @ $3.5 per LF = $9,219,175, 13% of the estimated direct Sub Bid Construction Cost, 1% of the estimated total Direct Construction Cost, used 31 times in the estimate, overrides = 1
32.3. detail Dump Fees - from Clearing & Grubbing , 147,943 TON @ $33. per TON = $4,882,124, 7% of the estimated direct Sub Bid Construction Cost, 1% of the estimated total Direct Construction Cost, used 89 times in the estimate, overrides = 1
32.4. detail Approximate Pump Station Cost, Approx size 50 cfs , 1 EA @ $4,200,000. per EA = $4,200,000, 6% of the estimated direct Sub Bid Construction Cost, 1% of the estimated total Direct Construction Cost, used 1 times in the estimate, overrides = 0
32.5. detail Bentonite, 1ton bag , 128,432 EA @ $102.17 per EA = $13,121,897, 19% of the estimated direct Sub Bid Construction Cost, 2% of the estimated total Direct Construction Cost, used 36 times in the estimate, overrides = 1

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
32.1 Updated quotes are being obtained and will be added to the Cost Estimate.
32.2 Notes/Quotes have been added to the estimate.
32.3 Note/Quotes have been added to the estimate.
32.4 A general layout plan of the pumping plants is being provided by the Civil Designers. Quantities will be based on work on similar pumping plants for the Natomas PACR project. Most costs are updated to reflect current labor-equipment-material costs.
32.5 Notes/Quotes have been added to the estimate. Material Cost is $98/TON for bentonite, DDelivery (FOB) is $102.17/TON.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Aug 31 2015

1-1 Backcheck Recommendation **Open Comment**
Please provide revised MII for verification. Comment remains open.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 02 2015

1-2 Backcheck Recommendation **Close Comment**
Documents Received. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 10 2015

Current Comment Status: **Comment Closed**

6207106 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

33. CONCERN: I have 4 CSRA files, each with a tab Base Cost Summary and a line item on row 29 that reads " Summary Construction Costs and L&D. Is it intended that the total for the line include the lands and damages?
SPK - American River Common Features - CSRA - 2015-07-13 DRAFT - ALT 2 (LPP).xlsm
SPK - American River Common Features - CSRA - 2015-07-06 DRAFT - ALT 1 (NED).xlsm
SPK - American River Common Features - CSRA - 2015-07-08 DRAFT - ALT 2 (LPP).xlsm
SPK - American River Common Features - CSRA - 2015-07-13 DRAFT - ALT 1 (NED).xlsm
BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements
SIGNIFICANCE: Medium
RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
Per the Note on line 8, the Lands and Damages ARE NOT part of the Summary Construction Costs used in calculation of construction contingencies.

I will advise the preparer of the CSRA to revise the titles in Row 29 for future projects. - Note this is incidental as I don't believe these tables are placed in the CSRA report that will be attached to the Cost Engr Appendix in the final Feasibility Report.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Sep 11 2015

1-1 Backcheck Recommendation **Close Comment**
Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 14 2015

Current Comment Status: **Comment Closed**

6207107 Cost Engineering n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

34. I have one MII file called "CE-ARCF_GRR-MII4_2-20150708.mlp" with a total estimated amount = 1,140,035,630.76. And I have 4 CSRA files, each with a tab Base Cost Summary and a line item on row 29 that reads " Summary Construction Costs and L&D". (The total cost for that line do not actually include lands and damages).
How do I get from the costs in the MII file to the costs in the csra files in tab Base Cost Summary, Summary Construction Costs and L&D line item on row 29?
SPK - American River Common Features - CSRA - 2015-07-13 DRAFT - ALT 2 (LPP).xlsm
SPK - American River Common Features - CSRA - 2015-07-06 DRAFT - ALT 1 (NED).xlsm
SPK - American River Common Features - CSRA - 2015-07-08 DRAFT - ALT 2 (LPP).xlsm
SPK - American River Common Features - CSRA - 2015-07-13 DRAFT - ALT 1 (NED).xlsm
BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements
SIGNIFICANCE: Medium
RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
The costs in the upper part of the spreadsheet (rows 1-56) are compiled from the data input in rows 57- for all the reaches in the alternative. Rows 57- are not compiled directly from the MII file, but from the TPCS. The TPCS reflects the MII files (column M, Estimated Cost Column C) for each Reach of Alts 1 and 2 relative to construction costs.
Note that all these values have changed based on the ATR comments and must be input into the CSRA spreadsheet, from which a CSRA report is being developed for inclusion in the final feasibility report.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Sep 11 2015

1-1 Backcheck Recommendation **Close Comment**
Understood. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 14 2015

Current Comment Status: **Comment Closed**

6207109 | Cost Engineering | n/a | n/a | n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

35. It appears to me that the costs in the TPCS files do not match up with the costs in the csra files::
ARCF-TPCS Form-Alt2-Multi Phase - Multi Contract 20150804.xlsx
ARCF-TPCS Form-Alt1-Multi Phase - Multi Contract 20150804.xlsx
SPK - American River Common Features - CSRA - 2015-07-13 DRAFT - ALT 2 (LPP).xlsm
SPK - American River Common Features - CSRA - 2015-07-06 DRAFT - ALT 1 (NED).xlsm
SPK - American River Common Features - CSRA - 2015-07-08 DRAFT - ALT 2 (LPP).xlsm
SPK - American River Common Features - CSRA - 2015-07-13 DRAFT - ALT 1 (NED).xlsm
BASIS: ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works, ER 1110-2-1302 Civil Works Cost Engineering, ER 1110-1-1300 Cost Engineering Policy and General Requirements
SIGNIFICANCE: Medium
RESOLUTION: In the comment evaluations, please provide a detailed explanation of what has been changed to the cost and schedule documents in response to the comment, including the location of the change. Explain why the comment does not require a change to the documents if no change is made. Address each statement or concern in the comment. In most cases, the comment is intended clarify a concern and the clarification must be included in the documents, not just in the evaluation. This will help to expedite the backcheck process in order to close comments as soon as possible.

Submitted By: Gary Smith (651 260 1819). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
It was my understanding from the developer of the CSRA that, at the time of submittal, these matched, but that is irrelevant now as the costs have changed.

The revised CSRA spreadsheet and report will be checked versus the revised TPCS submitted for backcheck to insure the costs match.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Sep 11 2015

1-1 Backcheck Recommendation **Open Comment**
This comment will remain open until a set of matching files has been provided for verification:
MII
TPCS
CSRA
Comment remains open

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 14 2015

1-2 Backcheck Recommendation **Close Comment**
Matching Documents have been received. Comment Closed.

Submitted By: Gary Smith (651 260 1819) Submitted On: Sep 14 2015

2-0 Evaluation **Concurred**
Per this comment and relevant emails between reviewers and Cost Engineers.
Updated CSRA results (spreadsheet including contingencies) and TPCS files utilizing those contingencies have been sent today.

The cost indicated in the previously provided MII file and the TPCS do match. See cell M76.
Cell M19 is a summation of costs for Relocations, including Construction of Relocations (M76), PED for Relocations (cell M105) and Construction Mngt for Relocations (cell M111).
This is typical for all reaches.

Submitted By: Robert Vrchoticky ((916) 557-7336) Submitted On: Sep 14 2015

Backcheck not conducted

Current Comment Status: **Comment Closed**

6207452 | Economics | n/a | Econ Appendix, p. 33. | n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

REVIEW CONCERN: TEHRA – Depth damage for TEHRA – It does not appear that separate TEHRA curves were developed and applied for 1 story vs. 2 story vs. MH structures, although the depth of flooding causes substantially different percent damages to these different structure types. BASIS: Documentation included in updated Economic Appendix. SIGNIFICANCE: Low. RECOMMENDED ACTION: Recommend either updating the analysis to include separate functions by structure type or justify application of a single curve for all types.

Submitted By: Michael Hallisy (213-452-3815). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
The following verbiage will be added to the final Economic Appendix "Although this analysis uses the same depth-damage curves for all residential structures, in reality there would be some differences in TEHRA costs between 1-story vs. 2-story vs. Mobile Homes. Because the majority of the residential structures in the study area are 1 story, these differences will have a limited impact on the result and would not affect plan selection." There is also a precendent for using this same methodology in the Sutter Feasibility study.

Submitted By: Nicholas Applegate (916-557-6711) Submitted On: Sep 08 2015

1-1 Backcheck Recommendation **Close Comment**
Response adequately addresses concern.

Submitted By: Michael Hallisy (213-452-3815) Submitted On: Sep 09 2015

Current Comment Status: **Comment Closed**

6207458 Economics n/a Econ Appendix, Table 14 n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

REVIEW CONCERN: Table 14 shows that damages by Basin and ACE changed for ARS (F) and ARN (A) from the prior submittal, but the EAD by Index Point values shown on Table 15 did not change. BASIS: Damage estimates in referenced tables. SIGNIFICANCE: Low (likely). RECOMMENDED ACTION: Please explain/verify these results (why EAD did not change despite changes in damages by ACE).

Submitted By: Michael Hallisy (213-452-3815). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
Changes will be verified to ensure consistency with FDA outputs. This update will be made at the same time the Appendix is updated for the final cerified costs. This will not impact the Recommended plan.

Submitted By: Nicholas Applegate (916-557-6711) Submitted On: Sep 08 2015

1-1 Backcheck Recommendation **Close Comment**
Closing comment, but please note resolution of this issue when submitting updated Econ Appendix.

Submitted By: Michael Hallisy (213-452-3815) Submitted On: Sep 09 2015

Current Comment Status: **Comment Closed**

6207461 Economics n/a Econ Appendix, Table 17 n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

REVIEW CONCERN: Emergency Costs – Table 17 shows without project EAD results for emergency costs separate from the other damage categories, which is fine. However, these damages/costs are part of total without project EAD. BASIS: The report should show total without project EAD that includes these damages/costs, as they represent approximately 13% of total computed damages. Also, this would serve as a matching reference later in the report where without project damages and benefits are shown for the ARS and ARN basins (Tables 46-50) that include emergency costs. SIGNIFICANCE: Low. RECOMMENDED ACTION: Recommend either moving the emergency cost analysis prior to the tables 15 and 16, and then including a column for these damages in the summary tables, or otherwise including an additional table after the emergency cost analysis showing total EAD that includes these costs.

Submitted By: Michael Hallisy (213-452-3815). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
The emergency cost analysis will be moved up prior to tables 15 and 16 and these costs will be added to the total EAD shown in those tables.

Submitted By: Nicholas Applegate (916-557-6711) Submitted On: Sep 08 2015

1-1 Backcheck Recommendation **Close Comment**
Comment closed - will review when updated econ appendix is submitted.

Submitted By: Michael Hallisy (213-452-3815) Submitted On: Sep 09 2015

Current Comment Status: **Comment Closed**

6207465 Economics n/a Econ Appendix, Section 4.3-4.5 n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

REVIEW CONCERN: These sections present without project damages and with project benefits that do not consider/include emergency costs. Preferably these costs would have been incorporated into these sections and result tables. BASIS: Project alternative evaluation should include all primary damage/benefit categories. SIGNIFICANCE: Low. RECOMMENDED ACTION: As noted preferably these costs should be incorporated into Sections 4.3-4.5. However, at a minimum, documentation should be added to the beginning of these sections that explain that the benefits presented do not include reductions in emergency costs, which are later discussed in Section 4.6, and why they are not included.

Submitted By: Michael Hallisy (213-452-3815). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
Emergency costs were only run for the dominant reaches, so they cannot be incorporated into all of the relevant tables in Sections 4.3-4.5. Text will be added to the final document describing this nuiance.

Submitted By: Nicholas Applegate (916-557-6711) Submitted On: Sep 08 2015

1-1 Backcheck Recommendation **Close Comment**
proposed action adequately addresses concern.

Submitted By: Michael Hallisy (213-452-3815) Submitted On: Sep 09 2015

Current Comment Status: **Comment Closed**

6207467 Economics n/a Econ Appendix, p. 55 n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

REVIEW CONCERN: Report notes that Alt 2 provides benefits to West Sacramento (and no longer refers to potentially offsetting increases in damages). It would be beneficial to elaborate on the significance/magnitude of these potential benefits and whether if considered and factored into the analysis, could result in Alternative 2 having greater net benefits/being the NED Plan. BASIS: Report should consider all significant benefit categories in the determination of the NED Plan. SIGNIFICANCE: Medium. RECOMMENDED ACTION: As noted, recommend this section elaborate on the significance/magnitude of these potential benefits to West Sacramento that were not quantified and whether if considered and factored into the analysis, could result in Alt 2 being identified as the NED Plan.

Submitted By: Michael Hallisy (213-452-3815). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
The offsetting of damages still exist and this section will be updated as follows: "The City of West Sacramento is located on the right bank (west side) of the Sacramento River adjacent to the confluence with the American River and directly across the river from the city of Sacramento. Widening the Sacramento Bypass (Alternative 2) results in water surface elevation reduction downstream on the Sacramento River adjacent to the city of West Sacramento. However, these potential benefits are not effectively realized because the highest damages within West Sacramento are instead driven by flooding coming from the Yolo Bypass, which does not see any decrease in water surface elevation as a result of the Sacramento Bypass widening."

Submitted By: Nicholas Applegate (916-557-6711) Submitted On: Sep 08 2015

1-1 Backcheck Recommendation **Close Comment**
Thanks - this is an important clarification.

Submitted By: Michael Hallisy (213-452-3815) Submitted On: Sep 09 2015

Current Comment Status: **Comment Closed**

6207470 Economics n/a Econ Appendix, Tables 46 & 48 n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

REVIEW CONCERN: Please verify the results shown on these tables. Specifically, the incremental and cumulative average annual benefits for fixing and raising or widening the Sacramento River are exactly the same as reported in the prior submittal, although the without project EAD now appears to include the emergency costs. The total benefits of $308.5M for Alt 1 and $309.4M for Alt 2 correspond with the computed benefits earlier in the report of $264M for structs/contents, plus $44M for emergency costs. However, all of the assigned increase in benefits in the incremental benefit/cost tables are assigned to 2B (Fix American River). So while the incremental benefits for 2b were previously around $25M, they are now around $68M. Presumably the increase in benefits associated with the emergency cost reductions would be spread between the increments. Results on this table do not appear to be correct. BASIS: Evaluation of updated damages/benefits. SIGNIFICANCE: Medium. RECOMMENDED ACTION: Please verify results and revise as necessary.

Submitted By: Michael Hallisy (213-452-3815). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
Need to verify this with the lead Economist when he returns from emergency leave, but presumably this is because the emergency costs were not calculated incrementally and instead only using the dominating without and with project FDA models. Resolution will be either a) the table will be revised to include emergency cost benefits spread out among the increments or b) text will be added describing why the benefit is not spread out.

Submitted By: Nicholas Applegate (916-557-6711) Submitted On: Sep 08 2015

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Michael Hallisy (213-452-3815) Submitted On: Sep 09 2015

Current Comment Status: **Comment Closed**

6207474 Economics n/a Econ Appendix, p. 60 n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

REVIEW CONCERN:. The Fix Creeks increment has very marginal economic justification for the ARN Basin. Concern is risk of including features as part of the NED Plan that may not be economically justified. BASIS: Reported results. SIGNIFICANCE: Medium. RECOMMENDED ACTION: Recommend adding a discussion of the probability this increment is economically justified based upon the HEC-FDA results showing probability EAD reduced exceeds indicated values.

Submitted By: Michael Hallisy (213-452-3815). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
Though the Fix Creeks increment is marginal and will likely remain very marginal, we are further justifying this increment based upon a social justice (OSE) argument as described in the text following Table 48. HQ made the same comment and were satified with the added OSE justification to move forward with including it as part of the NED plan. A probability table can be added to the report if absolutely necessary, but it will likely just show that it's essentially a 50% chance it will be above or below unity.

Submitted By: Nicholas Applegate (916-557-6711) Submitted On: Sep 08 2015

1-1 Backcheck Recommendation **Close Comment**
I am ok with not including the suggested table and instead just acknowledging the marginal justification. There is of course a risk that if there are any increases in costs for this increment this component of the project will not be economically justified.

Submitted By: Michael Hallisy (213-452-3815) Submitted On: Sep 09 2015

Current Comment Status: **Comment Closed**

6207476 Economics n/a Econ Appendix, Section 4.13 n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

REVIEW CONCERN: I would recommend renaming this section NED Optimization – Levee Raises for Alternative 1. BASIS: Title for this section of the appendix vs. the content. SIGNIFICANCE: Low. RECOMMENDED ACTION: Within this section, I would note that the two alternative levee heights were considered to verify that the NED levee scale was properly identified. This section is supporting the selected levee height as the NED levee height, rather than presenting an HEC-FDA sensitivity analysis.

Submitted By: Michael Hallisy (213-452-3815). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
This section will be re-named/revised as recommended.

Submitted By: Nicholas Applegate (916-557-6711) Submitted On: Sep 08 2015

1-1 Backcheck Recommendation **Close Comment**
response addresses concern

Submitted By: Michael Hallisy (213-452-3815) Submitted On: Sep 09 2015

Current Comment Status: **Comment Closed**

6207477 Economics n/a Econ Appendix, Section 4.14 n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

REVIEW CONCERN: Accuracy of statement that net benefits between alternatives are essentially equal. BASIS: Statement made in appendix regarding net benefits for Alts 1 and 2. SIGNIFICANCE: Low. RECOMMENDED ACTION: Recommend revising text to state that BENEFITS for the two plans are very similar and are essentially equal from an R&U perspective, rather than NET benefits. Given that the two plans have essentially the same benefits, the NED Plan is pretty clear as Alt 1, given it costs nearly $200M less.

Submitted By: Michael Hallisy (213-452-3815). Submitted On: Aug 21 2015

1-0 Evaluation **Concurred**
Statement will be revised as recommended.

Submitted By: Nicholas Applegate (916-557-6711) Submitted On: Sep 08 2015

1-1 Backcheck Recommendation **Close Comment**
response addresses concern.

Submitted By: Michael Hallisy (213-452-3815) Submitted On: Sep 09 2015

Current Comment Status: **Comment Closed**

6212786 Geotechnical n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

I reviewed the ARCF EIS/EIR located at \\155.88.8.200\pe\Elmo\Marc_Masnor\American_River_Common_Features\3_Final_GRR_ATR__Aug2015\Review_Documents_for_ATR_Comments. i have no comments on this document and no additional comments on the GRR.

Submitted By: Glen Bellew (816.389.3553). Submitted On: Aug 26 2015

Revised Sep 02 2015.

1-0 Evaluation **Concurred**
Concur with the comment. Thanks for your review.

Submitted By: Sara Schultz ((916) 557-7368) Submitted On: Sep 04 2015

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Glen Bellew (816.389.3553) Submitted On: Sep 08 2015

Current Comment Status: **Comment Closed**

6225189 Planning - Plan Formulation n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

I reviewed the American River Common Features Final General Reevaluation Report, Chapters 1-8, and Appendix A - Plan Formulation. I have no technical comments on these documents. Editorial comments were provided directly to the ATR Lead and the PDT.

Submitted By: Eric Lynn (816-983-3258). Submitted On: Sep 04 2015

1-0 Evaluation **Concurred**
Concur with the comment. Thanks for your review.

Submitted By: Sara Schultz ((916) 557-7368) Submitted On: Sep 04 2015

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Eric Lynn (816-983-3258) Submitted On: Sep 08 2015

Current Comment Status: **Comment Closed**

6225198 Hydraulics n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

I reviewed the final H&H appendices. I have provided my editorial comments to the PDT in an email.

No technical comment for this current review.

Submitted By: Shih-Huang Chieh (213-452-3571). Submitted On: Sep 04 2015

Revised Sep 04 2015.

1-0 Evaluation **Concurred**
Concur with the comment. Thanks for your review.

Submitted By: Sara Schultz ((916) 557-7368) Submitted On: Sep 04 2015

1-1 Backcheck Recommendation **Close Comment**
Comment closed.

Submitted By: Shih-Huang Chieh (213-452-3571) Submitted On: Sep 08 2015

Current Comment Status: **Comment Closed**

6229108 Civil n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

I have no further comments

Submitted By: Huma M Nisar (213-452-3665). Submitted On: Sep 09 2015

1-0 Evaluation **Concurred**
Thank you.

Submitted By: James Elsberry (916-557-5276) Submitted On: Sep 09 2015

1-1 Backcheck Recommendation **Close Comment**
The ATRT Lead has closed the "no comment" comment.

Submitted By: Marc Masnor (918-669-7349) Submitted On: Sep 10 2015

Current Comment Status: **Comment Closed**

6230558 Environmental n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Mitigation Monitoring Plan, Section 1.1 Purpose and Goals, para 1, last sentence, states that this plan "will also establish an adaptive management plan to allow for accomplishment of the goals and requirements of the mitigation...." Text is not clear whether the adaptive management plan would be a separate document or be contained within the mitigation and monitoring plan. If the intent is for the adaptive management plan to be an element of this plan, then recommend text be revised to clarify. Also, if the adaptive management plan element would be developed at a later time, then recommend adding text to state. If the intent is to have the adaptive management element in the plan now, then text should be clarified so reader has a clear understanding.

Submitted By: Tiffany Bostwick (213-452-3845). Submitted On: Sep 10 2015

1-0 Evaluation **Concurred**
Text modified to "This HMMP is a living document and will be modified as part of an adaptive management strategy to allow for the accomplishment of the goals and requirements in a constantly changing environment." Please note change of MMP to HMMP (Habitat Mitigation and Monitoring Plan) in order to be consistent with requests from NMFS.

Submitted By: Anne Baker ((916) 557-7277) Submitted On: Sep 10 2015

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Tiffany Bostwick (213-452-3845) Submitted On: Sep 11 2015

Current Comment Status: **Comment Closed**

6230559 Environmental n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Mitigation Monitoring Plan -- responsible parties, roles. The plan lacks information on who are the responsible parties for implementing the plan, when, etc. Plan should include text to identify the roles and responsibilities of the Corps versus the local sponsor or other partners with respect to implementation of this plan. Also, in the context of adaptive habitat management, plan should indicate the decision maker(s) and identify, as appropriate, any other parties/entities that would be involved in an advisory capacity.

Submitted By: Tiffany Bostwick (213-452-3845). Submitted On: Sep 10 2015

1-0 Evaluation **Concurred**
At this time some of the specifics (when implementation would take place) are yet to be determined, but the roles and responsibilities are part of the agreement between the Corps, USFWS, and NMFS. Added text: "The HMMP would be implemented by U.S. Army Corps of Engineers (Corps) staff through coordination with USFWS and NMFS. Monitoring would be conducted by qualified biologists from the Corps, USFWS, the Department of Water Resources (DWR), and the Sacramento Area Flood Control Agency (SAFCA) as necessary. Upon completion of the monitoring term as established by USFWS and NMFS, the land would be turned over to the non-Federal sponsor to be maintained in perpetuity."

Submitted By: Anne Baker ((916) 557-7277) Submitted On: Sep 10 2015

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Tiffany Bostwick (213-452-3845) Submitted On: Sep 11 2015

Current Comment Status: **Comment Closed**

6230560 Environmental n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Mitigation Monitoring Plan Table 3 - Did not find Table 3 referenced in the text, or explanation of significance of the table. Recommend adding text to provide context for inclusion of the table.

Submitted By: Tiffany Bostwick (213-452-3845). Submitted On: Sep 10 2015

1-0 Evaluation **Concurred**
Added text: Table 3 describes the types and amounts of habitat that would be potentially impacted by the project, the duration of the impacts, the amount of mitigation according to the requirements provided by USFWS and NMFS, and projected costs as estimated according to existing mitigation prices."

Submitted By: Anne Baker ((916) 557-7277) Submitted On: Sep 10 2015

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Tiffany Bostwick (213-452-3845) Submitted On: Sep 11 2015

Current Comment Status: **Comment Closed**

6230562 Environmental n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Mitigation Monitoring Plan Section 2.0. Para 4 identifies the consideration of application of adaptive management principles to the project. The text places emphasis on the potential changes to project objectives, expectations, assumptions, and success criteria. However, the text does not give consideration to potential changes or alternatives (adapting of) to management actions on the habitat/mitigation area based on monitoring results, which is one of the main aspects of adaptive management. Recommend adding text to identify the potential need for changes or alternatives in management actions on the habitat/mitigation area based on monitoring results.

Submitted By: Tiffany Bostwick (213-452-3845). Submitted On: Sep 10 2015

1-0 Evaluation **Concurred**
Added text: "In addition to modifying project objectives, there is a potential for changes to or adaptation of management actions based on monitoring results. The purpose of adaptive management is to enable strategic changes to improve the mitigation sites to functioning habitat."

Submitted By: Anne Baker ((916) 557-7277) Submitted On: Sep 10 2015

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Tiffany Bostwick (213-452-3845) Submitted On: Sep 11 2015

Current Comment Status: **Comment Closed**

6230563 Environmental n/a n/a n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

Mitigation Monitoring Plan Section 2.6 Special Status Fish Species makes a number of references to a green sturgeon mitigation and monitoring plan. It is not clear in the text whether this is a separate MMP to be developed, or the green sturgeon element would be further developed within this MMP during design. Recommend text be revised to clarify.

Submitted By: Tiffany Bostwick (213-452-3845). Submitted On: Sep 10 2015

1-0 Evaluation **Concurred**
The green sturgeon plan would be a part of the HMMP described in the remainder of the document. Revised text: "The Corps' final EIS/EIR for the American River Common Features GRR includes a proposal to further develop this HMMP to include a refined green sturgeon plan with the specific elements that are described below."

Submitted By: Anne Baker ((916) 557-7277) Submitted On: Sep 10 2015

1-1 Backcheck Recommendation **Close Comment**
Closed without comment.

Submitted By: Tiffany Bostwick (213-452-3845) Submitted On: Sep 11 2015

Current Comment Status: **Comment Closed**

Enclosure 2

COMPLETION STATEMENT OF AGENCY TECHNICAL REVIEW

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the **AMERICAN RIVER WATERSHED, COMMON FEATURES, FINAL GENERAL REEVALUATION REPORT, September 2015, and FINAL ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT, September 2015**, Sacramento District. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-214, 15 December 2012, Water Resources Policies and Authorities, CIVIL WORKS REVIEW. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The District quality control review was found to be adequate. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks.

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Date: 2015.09.14 13:20:08 -07'00'

Miki Fujitsubo, NTS for
Marc L. Masnor, P.E.
ATR Team Leader
CESWF-PEC-PF (Tulsa, OK)

Date

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Date: 2015.09.14 13:54:31 -07'00'

Eric Thaut
Review Management Organization
Representative
CESPD-PDS

Date

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Date: 2015.09.15 08:06:46 -07'00'

Dan P. Tibbitts
Project Manager
CESPK-PM-C

Date

DISTRICT'S STATEMENT

CERTIFICATION OF AGENCY TECHNICAL REVIEW
SEPTEMBER 2015

Of the:

AMERICAN RIVER WATERSHED
COMMON FEATURES
FINAL GENERAL REEVALUATION REPORT
September 2015

And

FINAL ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT
September 2015

Sacramento District

US Army Corps
of Engineers ®

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Subject: Agency Technical Review (ATR) of the **AMERICAN RIVER WATERSHED, COMMON FEATURES, FINAL GENERAL REEVALUATION REPORT, September 2015, and FINAL ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT, September 2015, Sacramento District**.

Significant concerns and the explanation of the resolution of agency technical review comments for the subject ATR are as follows:

- None

References.

a. ATR guidance: EC 1165-2-214, 15 December 2012, Water Resources Policies and Authorities, CIVIL WORKS REVIEW.
b. The Review Management Organization for this review was the Flood Risk Management Planning Center of Expertise (FRM-PCX), Eric Thaut.
c. The ProjnetTM DrChecks Project and Review titles are: Project: ARCF - General Reevaluation Report (GRR), TSP & Attachments, American River Common Features (ARCF), California (P2 #149827), Review: ATR Final EIS/EIR (10-14 Aug 2015) (00031).
d. The ATR review report is titled: FLOOD RISK MANAGEMENT, PLANNING CENTER OF EXPERTISE, REVIEW MANAGEMENT ORGANIZATION, AGENCY TECHNICAL REVIEW REPORT, SEPTEMBER 2015, Of the: AMERICAN RIVER WATERSHED, COMMON FEATURES, FINAL GENERAL REEVALUATION REPORT, September 2015, And, DRAFT ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT, September 2015, Sacramento District, and contains the ATR Completion Statement.

I certify that all comments resulting from ATR of the subject report have been closed to the satisfaction of the agency technical review team and the project delivery team has completed revisions as indicated in the evaluation of comments.

Rick L. Poeppelman

16 Sept 2015

Rick L. Poeppelman, P.E.
Chief, Engineering Division
CESPK-ED

Date

for Alicia E. Kirchner
Chief, Planning Division
CESPK-PD

9-14-15

Date

ProjNet Report

Comment Report: Comment Evaluation/Backcheck Contribution by Michael Scuderi
Project: ARCF - General Reevaluation Report (GRR), TSP & Attachments, American River Common Features (ARCF), California (P2 #149827) **Review**: ATR Final EIS/EIR (10-14 Aug 2015) (*00031*)
(sorted by Discipline , ID)

Displaying 6 comments for the criteria specified in this report.

Id	Discipline	Section/Figure	Page Number	Line Number
6308793	Environmental	n/a	2. Mitigation Ratios for threatened and endangered species not explained	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

CONCERN: While the inclusion of the Mayhew HSI does help to explain why the 1:1.6 ratio is suggested there is an incomplete explanation of the mathematics that produced that number.
BASIS FOR CONCERN: ER 1105-2-100, C-3(e) (2) does require clear justification of ratios.
SIGNIFICANCE OF CONCERN: High
ACTION NEEDED TO RESOLVE CONCERN: Further explain the development of the 1:1.6 ratio for Mayhew and then carry this forward to American River example. A justification for the bump-up to 2:1 can be found at:
http://training.fws.gov/courses/csp/csp3112/resources/Mitigation/WetlandMitigationRatios.pdf and https://fortress.wa.gov/ecy/publications/documents/1006011.pdf and
https://fortress.wa.gov/ecy/publications/documents/1006011.pdf
http://escholarship.org/uc/item/6x36z0r6, and
http://www.ecy.wa.gov/programs/sea/wetlands/bas/vol2final/Appendix%208-F_Volume%202_.pdf are two examples of research into why higher ratios are justified for temporal loss.

Submitted By: Michael Scuderi (206-764-7205). Submitted On: Nov 30 2015

1-0 Evaluation **Concurred**
The District will update the HMMAMP to elaborate on how the 1:1.6 ratio was calculated for Mayhew. Additionally, further justification will be included regarding the need for 2:1 mitigation based on the quantity of habitat lost and the habitat quality and function lost through mitigation when creating new habitat to replace mature riparian habitat. Thank you for providing the attached articles as a resource for this justification.

Submitted By: Anne Baker ((916) 557-7277) Submitted On: Dec 01 2015

1-1	Backcheck Recommendation **Close Comment** Explanation sufficient. Revised language should be reviewed. Submitted By: Michael Scuderi (206-764-7205) Submitted On: Dec 03 2015.
1-2	Backcheck Recommendation **Open Comment** Revised language does not reflect justification for 2:1 ratio. Suggest either eliminate ratio or provide jsutification Submitted By: Michael Scuderi (206-764-7205) Submitted On: Dec 18 2015.
1-3	Backcheck Recommendation **Close Comment** SPK provided justification of 2:1 ratio related to temporal loss and habitat benefits. Explanantion is sufficient to close out comments. Submitted By: Michael Scuderi (206-764-7205) Submitted On: Dec 18 2015.
	Current Comment Status: **Comment Closed**

Id	Discipline	Section/Figure	Page Number	Line Number
6308794	Environmental	n/a	3. Performance standards for mitigation measures are not included in mitigation plan	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

CONCERN: Performance criteria were changed to reflect physical aspects of the mitigation features (mainly survival) but are other measures such as percent cover better indicators of success. Also, that variable would better track with the HEP model (Northern Oriole) variables used in the impact analysis. Survivability might not be a consistent measure to use. Comment from Chemine Jackels "I imagine that percent survivability is difficult to assess after a couple of years. Percent coverage seems like a better metric, and should go up over time. We typically hold the contractor responsible for %100 survival after the first year. They need to replace plants that have died in the first year. These comments apply to all the vegetation monitoring metrics. "
BASIS FOR CONCERN: Required for Section 2036 of WRDA 2007. Performance criteria should be identified related to physical characteristics of the project and not on the survey of populations of species of concern.
SIGNIFICANCE OF CONCERN: Medium
ACTION NEEDED TO RESOLVE CONCERN: Consider adding other variables to monitor. At a minimum add some more explanatory text on why survivability is the best criteria to use (See my email notes also).
Submitted By: Michael Scuderi (206-764-7205). Submitted On: Nov 30 2015

1-0	Evaluation **Concurred** The District will update the performance standards. Concur that we will require the contractor to be responsible for 100% survivability during the first year. The District's assessment is that survivability percentage is a reasonable metric for the first three years, minimum. In addition, the District will monitor for percent cover starting at year one, and will include a performance standard for cover as a success criteria. The District also proposes to revise the criteria that requires the mitigation to meet "three consecutive years of survival" to "three consecutive years of survival following removal of supplemental irrigation". Submitted By: Anne Baker ((916) 557-7277) Submitted On: Dec 01 2015
1-1	Backcheck Recommendation **Close Comment** Explanation sufficient. Revised language should be reviewed. Submitted By: Michael Scuderi (206-764-7205) Submitted On: Dec 03 2015.
1-2	Backcheck Recommendation **Close Comment** Evaluation criteria changed to reflect cover as a criteria. Response is sufficient. Submitted By: Michael Scuderi (206-764-7205) Submitted On: Dec 08 2015.
	Current Comment Status: **Comment Closed**

Id	Discipline	Section/Figure	Page Number	Line Number
6308795	Environmental	n/a	3. Performance standards for mitigation measures are not included in mitigation plan	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

CONCERN: Why is there an expected decline in survivability from 75% to 60%
BASIS FOR CONCERN: It appears that there is a downward trend in vegetation survival that might continue after monitoring.
SIGNIFICANCE OF CONCERN: Medium
ACTION NEEDED TO RESOLVE CONCERN: Please explain if it is expected that survivability will level off and not continue declining trend. You can use or elaborate on past Sacramento projects.
Submitted By: Michael Scuderi (206-764-7205). Submitted On: Nov 30 2015

1-0	Evaluation **Concurred** The performance standards established in the table were not intended to portray a declining trend. Rather, they were intended to provide an outlet for meeting success in a scenario where a mitigation site is struggling. For example, if the site is not

	meeting success criteria following year 6, then the performance standard reduces to allow the mitigation to meet a lower standard instead. The District proposes to revise the performance standards to focus on percent cover in addition to survivability. The tables will be removed or revised to reflect the new standards. Ensuring that the vegetation meets survival criteria for three consecutive years following the removal of supplemental irrigation would ensure that any downward trends would not occur. Submitted By: Anne Baker ((916) 557-7277) Submitted On: Dec 01 2015
1-1	Backcheck Recommendation **Close Comment** Explanation sufficient. Revised language should be reviewed. Submitted By: Michael Scuderi (206-764-7205) Submitted On: Dec 03 2015.
1-2	Backcheck Recommendation **Close Comment** Survivability criteria have been downplayed verus usig cover as a monitoring criteria. Response sufficient. Submitted By: Michael Scuderi (206-764-7205) Submitted On: Dec 08 2015.
	Current Comment Status: **Comment Closed**

Id	Discipline	Section/Figure	Page Number	Line Number
6308797	Environmental	n/a	4. Adaptive Management is not included in mitigation plan.	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

CONCERN: No adaptive management plan was previously included
BASIS FOR CONCERN: Requirement of Section 2036 WRDA 2007
SIGNIFICANCE OF CONCERN: HIGH
ACTION NEEDED TO RESOLVE CONCERN:. AMP was added to HMMAMP. In section 2.6.4 at the beginning refer back to table 2. The only other factor to consider is are the costs details of the AMP sufficient for HQ review. Should not the costs be broken out by mitigation measure?
Submitted By: Michael Scuderi (206-764-7205). Submitted On: Nov 30 2015

1-0	Evaluation **Concurred** Will refer to the correct table in Section 2.6.4. The District will update the AMP to elaborate on the components of the cost estimate per year in tabular form. Submitted By: Anne Baker ((916) 557-7277) Submitted On: Dec 01 2015

1-1	Backcheck Recommendation **Close Comment** Explanation sufficient. Revised language should be reviewed. Submitted By: Michael Scuderi (206-764-7205) Submitted On: Dec 03 2015.
1-2	Backcheck Recommendation **Close Comment** Costs have been added to table. Thank you. Submitted By: Michael Scuderi (206-764-7205) Submitted On: Dec 08 2015.
	Current Comment Status: **Comment Closed**

Id	Discipline	Section/Figure	Page Number	Line Number
6308798	Environmental	n/a	5. Discounting of onsite mitigation and mitigation bank measures	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

CONCERN: Not enough detail is provided to justify the exact values of the discount rates. Why was .2 and .3 used and not 0 and .1? or some other numbers? It is also not clear how the temporal loss aspect factors into the mitigation determination.
BASIS FOR CONCERN: ER 1105-2-100 par. C-3(d)(5) requires justification for replacement rates.
SIGNIFICANCE OF CONCERN: HIGH
ACTION NEEDED TO RESOLVE CONCERN: Provide additional justification for discount rates even if it is BPJ or local expert analysis.
Submitted By: Michael Scuderi (206-764-7205). Submitted On: Nov 30 2015

1-0	Evaluation **Concurred** Justification for the 20% discount rate on onsite mitigation is provided through the HEP discussion. Please see Table 4 for justification of this discount. The District concurs that the additional 10% discount for mitigation banks is not justified. The ARCF GRR CE/ICA is being revised to remove this reduction. It was not applied to the West Sac GRR CE/ICA. Submitted By: Anne Baker ((916) 557-7277) Submitted On: Dec 01 2015

1-1	Backcheck Recommendation **Close Comment** Explanation sufficient. Revised language should be reviewed. Submitted By: Michael Scuderi (206-764-7205) Submitted On: Dec 03 2015.

1-2	Backcheck Recommendation **Close Comment** Discount has been explained by revised text. Removal of 0.10 for off-site is acceptable. Submitted By: Michael Scuderi (206-764-7205) Submitted On: Dec 08 2015.
	Current Comment Status: **Comment Closed**

Id	Discipline	Section/Figure	Page Number	Line Number
6308799	Environmental	n/a	Responses to 6, 7, and 8 HQ Responses	n/a

Comment Classification: **Unclassified\\For Official Use Only (U\\FOUO)**

FOR INFORMAITON ONLY: Mitigation Plan rewrite is adequate.

Submitted By: Michael Scuderi (206-764-7205). Submitted On: Nov 30 2015

1-0	Evaluation **Concurred** Thank you for your concurrence/review. Submitted By: Anne Baker ((916) 557-7277) Submitted On: Dec 01 2015

1-1	Backcheck Recommendation **Close Comment** Closed without comment. Submitted By: Michael Scuderi (206-764-7205) Submitted On: Dec 03 2015.
	Current Comment Status: **Comment Closed**

Report Complete

Classified information is NOT permitted on this site. Do NOT share your ProjNet password. Questions and comments to Call Center , 1-217-367-3273 or 1-800-428-HELP (4357)

- Patent 11/892,984 property of ERDC since 2004.

CESWF-PEC-PF (Tulsa, OK) January 14, 2016

MEMORANDUM FOR RECORD

SUBJECT: Targeted Agency Technical Review of the Habitat Mitigation Monitoring and Adaptive Management Plan, December 2015 - AMERICAN RIVER WATERSHED, COMMON FEATURES, FINAL GENERAL REEVALUATION REPORT, and FINAL ENVIRONMENTAL IMPACT STATEMENT / ENVIRONMENTAL IMPACT REPORT, Sacramento District.

1. The Chief of Planning in Sacramento District requested the subject review. The District had received comments from HQUSACE in November 2015, regarding the mitigation plans for the subject project and WEST SACRAMENTO PROJECT, FINAL GENERAL REEVALUATION REPORT, AND FINAL ENVIRONMENTAL IMPACT STATEMENT /ENVIRONMENTAL IMPACT REPORT, September 2015. The District agreed with the comments and recognized that substantive revisions of the mitigation plans would be necessary. The HQUSACE comments applied to the methodology applied to the mitigation plans for the two projects. The agency technical review for both projects final general reevaluation reports and NEPA documents had been completed in September 2015. The Sacramento District contacted the Flood Risk Management Planning Center of Expertise to coordinate a targeted review.

2. The charge for the review reflected the HQUSACE comments and was summarized as verifying that mitigation plan revisions were consistent with the Water Resources Development Act of 2007, Section 2036. Because the methodology was the same for the two projects, the review document would be the subject project mitigation plan. The applicable mitigation plan revisions would be made by the District for both projects.

3. The revised mitigation plan was reviewed by Mr. Michael R. Scuderi, CENWS. Mr. Scuderi provided five technical comments and the subsequent sixth comment concluded that District evaluations and mitigation plan revisions had adequately addressed his comments. In general, the technical comments suggested additional discussion be added to more clearly present the mitigation plan.

4. The targeted review is complete. Mitigation plans for both projects have been revised. No further action by the District is required for agency technical review. A report of all comments is enclosed for the subject project.

District.

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1 Encl

Marc L. Masnor
ATR Team Lead

DEPARTMENT OF THE ARMY
SOUTH PACIFIC DIVISION, CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1399

REPLY TO
ATTENTION OF

CESPD-PDP (FRM-PCX) 27 July 2015

MEMORANDUM FOR Commander Sacramento District, U.S. Army Corps of Engineers (CESPK-PM-C/Mr. Dan Tibbitts)

SUBJECT: Final Comment Response Record for the Independent External Peer Review (IEPR) of the American River Common Features General Re-evaluation Report (GRR)

1. References:

a. EC 1165-2-214, Civil Works Review, 15 December 2012.

b. Memorandum, CESPD-PDP (FRM-PCX), 8 June 2015, subject: FRM-PCX Transmittal of Final Independent External Peer Review (IEPR) Report for American River Common Features General Re-evaluation Report (GRR).

2. Enclosed is the Final Comment Response Record for the IEPR of the American River Common Features GRR.

3. The Flood Risk Management Planning Center of Expertise (FRM-PCX) coordinated the IEPR, which was conducted by an external panel of experts selected and managed by the Battelle Memorial Institute. The IEPR panel comments are documented in the Battelle report titled Final Independent External Peer Review (IEPR) Report for American River Common Features General Re-evaluation Report (GRR), dated 3 June 2015.

4. Seventeen IEPR final comments were developed by the panel, one of which was identified as having high significance. The Comment Response Record documents the Sacramento District responses to the panel comments and the IEPR panel backcheck of the responses. Concurrence was reached between the panel and District on all of seventeen responses; however, the panel provided clarifying statements as part of its concurrence with the District response to the final panel comments 1, 7, 14 and 15.

5. Based on the Comment Response Record, the Sacramento District should prepare a written proposed response to the Final IEPR Report in accordance with reference 1a. The proposed response should be coordinated with the Major Subordinate Command District Support Team and HQUSACE to ensure consistency with law, policy, project guidance, ongoing policy and legal compliance review, and other USACE or National considerations.

CONTRACT NO. W912HQ-10-D-0002
Task Order: 0068

Comment Response Record for the Final Panel Comments for the American River Common Features GRR IEPR

Prepared by

Battelle
505 King Avenue
Columbus, Ohio 43201

for

Department of the Army
U.S. Army Corps of Engineers
Flood Risk Management Planning Center of Expertise
Baltimore District

July 24, 2015

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LIST OF ACRONYMS

ADM	Agency Decision Milestone
AEP	annual exceedance probability
ARCF	American River Common Features
ATR	Agency Technical Review
BA	Biological Assessment
BMP	best management practices
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
COI	Conflict of Interest
CRPR	California Rare Plant Rank
CVFPB	Central Valley Flood Protection Board
CWRB	Civil Works Review Board
DrChecks	Design Review and Checking System
DWR	Department of Water Resources (CA)
EAD	expected annual damages
EC	Engineer Circular
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
ESA	Endangered Species Act
FWOP	future without-project
GRR	General Re-evaluation Report
H&H	Hydrologic and Hydraulic
HEP	Habitat Evaluation Procedure
HSI	Habitat Suitability Index
IEPR	Independent External Peer Review
IWR	Institute for Water Resources

JFP	Joint Federal Project
NED	National Economic Development
NEPA	National Environmental Policy Act
OEO	Outside Eligible Organization
OMB	Office of Management and Budget
PCX	Planning Center of Expertise
PDT	Project Delivery Team
SAFCA	Sacramento Area Flood Control Agency
SAR	Safety Assurance Review
SRA	Shaded Riverine Aquatic
TSP	Tentatively Selected Plan
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Services
VELB	valley elderberry longhorn beetle
WRDA	Water Resources Development Act

Final Panel Comment 1

It is not clear why the hydraulic profile for the future without-project condition is significantly higher than the profile for Alternative 1.

Basis for Comment

Based on Section 3.4 of the Hydraulic Appendix Executive Report (Appendix C, Attachment B of the GRR), the future without-project (FWOP) conditions "will serve as the baseline for alternative comparison" in this GRR and, based on Section 2.2 of the Hydraulic Appendix, the FWOP conditions include the change in operations at Folsom Dam due to the Joint Federal Project (JFP).

In Plate 44 of the Hydraulic Appendix, the 200-year water surface profile for the baseline condition (i.e., FWOP) appears to be significantly higher than the profile for Alternative 1. Based on the information above, it would seem that, hydraulically, Alternative 1 would only be affected by raised levee heights south of the American River confluence, which in turn would potentially cause Alternative 1 to be higher than the baseline condition. In addition, since the Natomas levees are not being raised for this analysis and therefore would have no effect on the baseline condition or Alternative 1, the baseline condition would not be expected to be higher than Alternative 1.

For the 10-year flood event, it is not clear why the baseline and Alternative 1 would be any different (see Plate 42 as an example) since the 10-year event would not be expected to overtop levees under either condition.

Plates 42 and 44 represent examples of the two profile issues noted above. These issues are apparent on several other profiles between Plates 31 to 56. Each profile represents a different reach of the rivers and canal systems for either the 10-year (Plates 31 to 43) or the 200-year (Plates 44 to 56) events.

Significance – High

If the baseline condition is not correct, there is a high risk that the flood damage estimates will be incorrect. If, on the other hand, Alternative 1 is incorrect, then there is a risk that the National Economic Development (NED) plan has not been identified.

Recommendation for Resolution

1. Verify the baseline conditions and Alternative 1 profiles on all Plates 31 to 56 in the Hydraulic Appendix Executive Report and adjust analysis as necessary.

PDT Final Evaluator Response (FPC#1):

Concur. The water surface profiles for Alternative 1 and the future without-project condition are identical. The differences observed in the plates were from a superseded and now out of date strategy to measure hydraulic effects of a combination of projects along the American River including the Joint Federal Project Auxiliary Spillway.

Recommendation #1: Adopt

Plates 31 to 56 in the Hydraulic Appendix Executive Report have been verified for baseline conditions and Alternative 1 profiles.

Panel Final BackCheck Response (FPC#1):

Concur. By replacing the plates in the Hydraulic Appendix Executive Report with up-to-date plates, the USACE response adequately addresses the FPC.

Final Panel Comment 2

Details as to why non-Federal agencies would not continue to undertake incremental improvements to the levee system in the future without-project condition are not included in the GRR.

Basis for Comment

The GRR describes work the non-Federal sponsors have done, and are currently doing, to improve the levee systems in the study area. However, the FWOP condition described in the report assumes that no additional improvements will be made to the levee system by USACE, the non-Federal sponsors, or other local agencies. It is not clear why local interests would not continue or even increase their efforts to make improvements to the levee system if no USACE project was anticipated. A clear understanding of the rationale supporting the projected FWOP condition is needed to provide confidence in the results of the evaluation and comparison of alternative plans.

Significance – Medium

If, in the future, non-Federal agencies would continue to make improvements to the levee system in the absence of a Federal project, then the flood risk management benefits of the action alternatives for the ARCF GRR may be overstated.

Recommendation for Resolution

1. Explain in the GRR and Economics Appendix why it is anticipated that local interests will not make improvements to the levee system in the FWOP condition.

PDT Final Evaluator Response (FPC#2):

Concur. The non-Federal sponsor, in addition to partnering with USACE on ongoing and completed flood risk management projects in the study area, has undertaken several large levee improvement projects on their own, including the Natomas Levee Improvement Program (NLIP). The sponsor has also indicated that they will be seeking both permission to alter the Federal Flood Management Project (Section 408) and Credit Consideration (Section 221) for levee improvement work they intend on constructing prior to implementation of the ARCF GRR recommended project. Section 221 of the Flood Control Act of 1970 as amended by Section 2003 of the Water Resources Development Act (WRDA) of 2007 (42 U.S.C. 1962d-5b) allows the sponsor to seek credit for the study, design and construction of Federally authorized water resources development projects that are carried out after the execution of an agreement with the ASA(CW). Where there is a cost sharing agreement, the sponsor may provide in-kind contributions in accordance with the terms of the applicable agreement. The sponsor has indicated that they intend to construct portions of the levee improvements recommended by the GRR that are considered the highest risk areas and seek credit for those improvements. These actions will not be considered part of the without project condition however, in order that the sponsor may receive credit consideration in the future.

With the construction of these multiple projects, SAFCA, the local cost sharing sponsor, had indicated that they are reaching the limit of their funding capabilities with the existing parcel assessments they use to fund flood risk management projects. The State of California, which is the direct cost sharing partner with

USACE, has a larger funding capability, but they would like to distribute funding to other underserved areas beyond the Sacramento Region.

Recommendation #1: Adopt
Additional language has been added to Section 2.8 (Future Without-Project Condition) of the GRR and the Economics Appendix to explain that the non-Federal sponsor will have future funding limitations that will hamper their ability to construct the project without the involvement of the Federal Government. It will also note that the sponsor will be seeking both permission to alter the Federal Flood Management Project (Section 408) and Credit Consideration (Section 221) for levee improvement work they intend on constructing prior to implementation of the ARCF GRR recommended project. These actions will not be considered part of the without project condition however, in order that the sponsor may receive credit consideration in the future.

Panel Final BackCheck Response (FPC#2):

Concur.

Final Panel Comment 3

Baseline conditions for invasive plants in the project area, and an effects analysis for invasive plant spread as a result of project construction, have not been presented.

Basis for Comment

The Draft EIS/EIR does not discuss the baseline conditions for invasive plants in the project area (e.g., their presence or potential to occur) and how project implementation could result in their introduction or spread. For example, invasive plants could be inadvertently introduced or spread in the project area during construction activities if nearby source populations passively colonize disturbed ground, or if construction and personnel equipment is transported to the site from an infested area. In addition, soil, vegetation, and other materials transported to the project area from off-site sources for best management practices (BMPs), revegetation, or fill for project construction could contain invasive plant seeds or plant material that could become established in the project area.

Executive Order 13112 (E.O.13112, 1999), which established a National Invasive Species Council, directs all Federal agencies to prevent the introduction and control the spread of invasive species in a cost-effective and environmentally sound manner to minimize their economic, ecological, and human health impacts. If significant impacts could occur, standard invasive plant management practices are available and should be considered as part of the project design or mitigation. However, the Draft EIS/EIR does not present an effects analysis of invasive plant spread as a result of project construction.

Significance – Medium

The Draft EIS/EIR is not clear whether the effects related to invasive plants have been adequately evaluated and, if needed, mitigated. The potential for construction-related introduction and spread of invasive species that is not addressed or mitigated would elevate the risk to native biological communities and may affect project approval/implementation.

Recommendations for Resolution

1. Discuss existing conditions for invasive plants/noxious weeds in the project area in Section 3.6 (Vegetation and Wildlife) of the Draft EIS/EIR. If recent field or other site-specific data to characterize invasive plant conditions in the study area are not available, then a summary of the expected or likely conditions there based on land cover types, levels of disturbance, and known invasive plant occurrences in nearby areas would be adequate.
2. Discuss construction-related impacts in the effects analysis and consider whether mitigation to prevent invasive plant spread during construction is needed.

PDT Final Evaluator Response (FPC#3):

Concur. The requested information will be added to the appropriate sections of the report.

Recommendation #1: Adopt
Will add invasive species discussion to vegetation and wildlife section.

Recommendation #2: Adopt
Will add discussion of invasive species introduction during construction and include mitigation measures to address this.

Panel Final BackCheck Response (FPC#3):

Concur.

Literature Cited:

E.O. 13112 (1999). Invasive Species. Executive Order 13112, 64 Federal Register 6183 (February 8, 1999). Available online at http://www.gpo.gov/fdsys/pkg/FR-1999-02-08/pdf/99-3184.pdf

Final Panel Comment 4

Some biological resources in the study area potentially affected by project implementation have not been analyzed or presented in sufficient detail to describe the existing conditions and support the Draft EIS/EIR analysis.

Basis for Comment

The Panel found that several biological resource issues were not addressed or presented clearly in the Draft EIS/EIR. The following points summarize the Panel's concerns:

- Although the Draft EIS/EIR discusses vegetation/habitat types within the study area, it does not include supporting figures/maps showing the distribution and types of land cover and other biological resources in the study area potentially affected by project implementation. Detailed representations of the distribution and types of land cover and other potentially affected biological resources, using graphics and/or tables, are important for describing the existing conditions and evaluating potential impacts. Also important would be a table that quantifies (in acres) and compares the amount of each land cover type, including waters of the U.S., assumed to be affected under each alternative.
- In Section 3.6 (Vegetation and Wildlife), it is not clear whether or how the vegetation variance to protect riparian vegetation on the waterside of improved levees was factored into the quantification of riparian vegetation impacts (locations, acreages). It is important to describe whether the estimate of riparian/Shaded Riverine Aquatic (SRA) habitat loss presented in the analysis already accounts for reduced impacts under the vegetation variance.
- Section 3.8 (Special-Status Species) does not address any special-status plant species, which include those considered by California Department of Fish and Wildlife (CDFW) to be "rare, threatened or endangered in California" and have a California Rare Plant Rank (CRPR); listed or designated as a candidate as threatened or endangered under the Federal Endangered Species Act (ESA) or California Endangered Species Act (CESA); etc. For projects subject to California Environmental Quality Act (CEQA), effects on special-status plant species must be considered. In addition, effects on special-status plant species are included in the "Basis of Significance" for evaluating impacts in the Draft EIS/EIR (p.127); however, they are not mentioned elsewhere in the environmental setting or impact analysis.
- Section 3.8 lacks discussion and analysis of several special-status species that could occur in the study area and be affected by project implementation, such as burrowing owl, tricolored blackbird, northern harrier, special-status bats, and others.
- The quantification of impacts on elderberry shrubs and valley elderberry longhorn beetle (VELB) is not clear. Tables 9, 10, and 11 of the Draft Biological Assessment (BA, p. 71) summarize the number of elderberry shrubs and stems that would be affected, observed exit holes, and proposed compensation for loss of shrubs. However, on page 65, the BA states: "The Corps conducted surveys in 2012 of the levee systems within the action area … The survey located elderberry clusters, however, actual shrubs, stem size, nor exit hole presence were determined." These two statements appear inconsistent. Because VELB is listed as threatened under ESA, and the U.S. Fish and Wildlife Service (USFWS) requires the implementation of specific mitigation requirements for impacts on VELB and its habitat (elderberry shrubs), clarifying how impacts on elderberry shrubs and VELB were estimated is important for evaluating the adequacy of the impact analysis and proposed mitigation.

- In the Draft EIS/EIR, tree removal is discussed in adequate detail. However, how it relates specifically to compliance or conflict with the American River Parkway Plan, the Sacramento County Tree Preservation Ordinance, or the City of Sacramento Protection of Trees Ordinance is not discussed. Conflict with these plans and ordinances is listed as a criterion for significance in the Draft EIS/EIR (p. 98). However, how the proposed mitigation would achieve compliance with these plans and ordinances is not described.
- Section 3.6 (Vegetation and Wildlife) does not fully discuss project-related impacts on Federally protected wetlands and other waters of the United States, and how those effects would be mitigated (e.g., completion of a wetland delineation and appropriate compensation, as needed). The effects on stream habitats protected under Section 1600 of the California Fish and Game Code (Streambed Alteration Agreements) and mitigation of those effects are also not addressed.
- The discussion of cumulative effects on special-status species in the Draft EIS/EIR (Section 4.2.4) is limited to only special-status fish and giant garter snake. However, other special-status species evaluated in Section 3.8 (Special-Status Species) (e.g., valley elderberry longhorn beetle, Swainson's hawk, etc.) belong in the cumulative effects analysis.

Significance – Medium

Some of the biological rationale and evidence to evaluate the magnitude of effects and support the conclusions are not clearly presented, which is a substantive issue for California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) review. Not addressing or mitigating (if needed) these potential project-related impacts would increase the risk to special-status species and other biological resources and may affect project approval/implementation.

Recommendations for Resolution

1. Prepare and add to the Draft EIS/EIR figures that depict biological resources within the study area, including vegetation/habitat types in relation to proposed project features.
2. Add a table in Section 3.6 that quantifies (in acres) and compares the amount of each land cover type, including waters of the U.S., assumed to be affected under each alternative.
3. Clarify in Section 3.6 whether the vegetation variance to protect riparian vegetation on the waterside of improved levees was factored into the quantification of riparian vegetation impacts (locations, acreages); describe whether the estimate of riparian/SRA habitat loss presented in the analysis already accounts for reduced impacts under the vegetation variance.
4. In Section 3.8, define which categories of special-species were evaluated (e.g., species listed as threatened or endangered under ESA or CESA, designated by CDFW as species of special concern, Fully Protected under the California Fish and Game Code, plant species with a CRPR rank [formerly California Native Plant Society list], etc.)
5. Add an analysis of special-status plant species to Section 3.8, including information on existing conditions, a table that summarizes special-status plant species with potential to occur in the study area (similar to Table 17 for wildlife), an analysis of potential effects, and proposed mitigation.
6. Expand the analysis in Section 3.8 to include all special-status animal species with potential to occur in the study area (e.g., add species such as tricolored blackbird, northern harrier, special-status bats, etc.). In Table 17, include all special-status animals initially considered or with

potential to occur. For any of those species that could occur and be affected, analyze potential effects of project implementation and, if needed, describe the proposed mitigation for any significant effects. For a more complete list and discussion of species in the area, refer to USACE's West Sacramento Project EIS/EIR.

7. In the Draft BA and the Draft EIS/EIR, clarify how impacts on elderberry shrubs and VELB were quantified from the survey data; resolve the inconsistency in survey information presented in pages 65 and 71 of the Draft BA.
8. In Section 3.6, add a discussion of tree removal as it relates to compliance or conflict with the American River Parkway Plan, the Sacramento County Tree Preservation Ordinance, or the City of Sacramento Protection of Trees Ordinance. Describe whether tree removal would conflict with these plans and ordinances, and how the proposed mitigation would achieve compliance with these plans and ordinances.
9. In Section 3.6, add a discussion of project-related impacts on Federally protected wetlands and other waters of the United States, and how those effects would be mitigated (e.g., completion of a wetland delineation and appropriate compensation, as needed). Also discuss the effects on stream habitats protected under Section 1600 of the California Fish and Game Code (Streambed Alteration Agreements) and mitigation for those effects.
10. In Section 4.2.4, expand the discussion of cumulative effects to include all special-status species addressed in Section 3.8 (e.g., VELB, Swainson's hawk, etc.).

PDT Final Evaluator Response (FPC#4):

Concur. Additional analysis will be conducted as noted below:

Recommendation #1: Adopt
Figures will be added to the EIS/EIR denoting the vegetation/habitat types within the study area.

Recommendation #2: Adopt
A table that quantifies habitat types affected by alternative will be included. .

Recommendation #3: Adopt
Will clarify language in the document to ensure that it is clear that the estimate of SRA habitat loss includes the reduced impacts under the vegetation variance.

Recommendation #4: Adopt
Will give designations to special status species listed in the table in Section 3.8 and describe which species were evaluated.

Recommendation #5: Adopt
Will add a section on special-status plant species affected by the project and will include those considered by CDFW, CNPS and USFWS.

Recommendation #6: Adopt
Will review the species lists generated by USFWS and CDFW to ensure all special status species that could occur in the project area are addressed in the document and will add them to the table.

Recommendation #7: Adopt
Will ensure that language and impacts regarding VELB are consistent between the BA and the EIS.

Recommendation #8: Adopt
Will add a discussion on how tree removal for the project relates specifically to the American River Parkway Plan, the Sacramento County Tree Preservation Ordinance, and the City of Sacramento Protection of Trees Ordinance. Will describe how the proposed mitigation would comply with the plans.

Recommendation #9: Adopt
Will clarify wetland impact discussion and mitigation as well as stream habitats protected under Section 1600. Wetland delineations will be conducted in PED.

Recommendation #10: Adopt
Will add discussion of all special status species to the cumulative effects section.

Panel Final BackCheck Response (FPC#4):

Concur.

Final Panel Comment 5

The justification to use a content-to-structure value ratio of 50% to calculate the value of contents of residential structures has not been explained and the reasonableness of this ratio is unknown.

Basis for Comment

The damageable value of the contents of residential structures is estimated to be over $12 billion. This is the second highest category of damageable property for structures or contents – only the damageable value of residential structures is higher. The Economics Appendix (Section 2.7) describes significant field investigation and analyses for estimating the damageable value of residential and non-residential structures.

Given the magnitude of the value of damageable contents of residential structures, it is important that the methodology or rationale for estimating the value be presented. The Economics Appendix (p. 29) states that a 50% content-to-structure ratio was used. The evidence provided to support this assumption is that it was used in prior American River Watershed studies. The GRR does not offer an explanation of why a 50% content-to-structure value ratio is reasonable for use in this study, or how it is specific to the study area and the period of analysis.

Significance – Medium/Low

The value of damageable contents of residential structures represents a significant portion of the total damageable property and requires an explanation of why use of a 50% content-to-value ratio is reasonable in order to provide confidence in the computed flood damages.

Recommendation for Resolution

1. Provide an explanation in the Economics Appendix of why use of a 50% content-to-structure value ratio is appropriate to calculate damageable property for this study.

PDT Final Evaluator Response (FPC#5):

Concur. The residential content-to-structure value ratio (CSVR) of 0.5 (50%) was used to derive an order of magnitude estimate of the value of damageable property (contents) for reporting purposes only; please note that the ratio was not used to estimate actual residential content values for use in the calculation of expected annual damages (EAD) or annual benefits. While it is understood that the 0.5 CSVR cannot realistically be applied broadly to all homes in the study area, it has been used in past District studies as a simple but adequate way to help derive an estimate of the total value of property in the study area and as a way to gage the magnitude of content damages should a flood event occur. The 0.5 CSVR, as used specifically and solely for reporting purposes in this study, does not have any effect on EAD, annual benefits, net benefits, or benefit-to-cost ratios (BCR).

The economic analysis used the generic depth-percent damage curves (contents) provided in the USACE Economic Guidance Memorandum (EGM) 01-03, *Generic Depth-Damage Relationships* (2000), so it was not necessary to explicitly estimate residential content values for use in the damage/benefit analyses. The EGM 01-03 curves for contents are adjusted curves that rely on structure values to derive content

damages; structure values were explicitly estimated for residential structures in the study area.

Recommendation #1: Adopt
The Economic Appendix will provide clarifying language which explains the primary purpose for using a residential 0.5 CSVR in this study.

Panel Final BackCheck Response (FPC#5):

Concur.

Final Panel Comment 6

The magnitude of impacts and level of significance for the effects of sedimentation and turbidity on fisheries resources are not easily determined.

Basis for Comment

The analysis presented in Section 3.7 (Fisheries) of the Draft EIS/EIR concludes that an increase in sedimentation and turbidity would result from project construction. In-stream effects such as suspended sediment, turbidity, and sediment deposition is mentioned generally, but the specific types and expected magnitude of these effects under each alternative are not described.

In terms of the specific significance criteria used for fisheries resources (Draft EIS/EIR, p.111), it is not clear how the level of significance was determined. For example, it is not certain what assumptions were made about the amount of increased sedimentation and turbidity that would be considered substantial and therefore significant.

Significance – Medium/Low

Without a discussion of the specific types and magnitude of impacts on fisheries resources relative to baseline conditions, the quality and completeness of the analysis are limited, and the biological rationale to support the conclusions and adequacy of proposed mitigation (e.g., BMPs) are not clear.

Recommendations for Resolution

1. Expand the discussion of anticipated project effects on fisheries resources. The discussion should describe impact mechanisms and the types and magnitude of biological effects. Any applicable modeling projections for project-generated in-stream effects (e.g., sediment and turbidity) and/or modeling of effects on fish habitat that may have been conducted for the project would be appropriate to reference in the fisheries analysis.
2. Discuss the assumptions made about the amount of project-related increased sedimentation and turbidity (relative to baseline conditions) that would result from project implementation, and the amount that would be considered substantial and therefore significant. If any amount of increase is considered significant, then clarify that point.

PDT Final Evaluator Response (FPC#6):

Concur. The Corps will update the EIS/EIR to include the recommendations discussed below.

Recommendation #1: Adopt
The Corps will ensure that the fisheries section includes impact mechanisms and the types and magnitude of biological effects. These analyses will be prepared and included in the final report.

Recommendation #2: Adopt
The Corps will ensure that the fisheries section includes a discussion regarding the assumptions made about project-related increased sedimentation and turbidity (relative to baseline conditions). The significance criteria will be clarified.

Panel Final BackCheck Response (FPC#6):
Concur.

Final Panel Comment 7

It is unclear why several of the planning objectives are required; some are redundant or not appropriate to fully evaluate alternatives.

Basis for Comment

Limiting the number of planning objectives (and associated metrics) to only those that are necessary to fully evaluate alternatives helps focus the planning process and helps clarify decision making. The GRR presents five planning objectives. The first two appear to be redundant: (1) reduce the probability of flooding, based on annual exceedance probability (AEP), and (2) reduce the consequences of flooding, based on expected annual damages (EAD). The probability of flooding (AEP) is only useful for comparing alternatives if the consequences of flooding are known. The EAD is a measure of both the probability and consequences of flooding. If EAD is used, evaluation of AEP provides no additional information that is useful to decision-making and should not be included.

Given that Sacramento is the state capital and is home to many agencies that are responsible for administering essential state programs, the third planning objective (to reduce impacts on critical infrastructure) provides important information to decision makers that is not addressed in the EAD (or the AEP) and should be retained.

The final two planning objectives identified in the GRR (to encourage wise use of the floodplain and to educate the public about residual risks) are non-structural management measures directed at the objective of reducing EAD. They are a means of achieving an objective. Furthermore, these measures are already in place as part of the existing flood risk management project for the American River. Since the final two planning objectives (to encourage wise use of the floodplain and to educate the public about residual risks) are management measures that should be part of the FWOP condition, they should be eliminated as planning objectives.

The five planning objectives established in the GRR could be reduced to two without losing any information that would be critical to decision making. The remaining planning objectives would be:

1. Reduce flood risk in the study area as measured by the EAD
2. Reduce impacts on critical infrastructure.

Significance – Medium/Low

Streamlining the planning objectives will focus the evaluation of alternatives on the most critical metrics and will simplify decision-making.

Recommendations for Resolution

1. Combine the first and second planning objectives into one: reduce the EAD in the study area. This captures both the frequency of flooding and the consequences of flooding in one metric.
2. Eliminate the final two planning objectives (to encourage wise use of the floodplain and to educate the public about residual risk) and add them to the FWOP condition.

PDT Final Evaluator Response (FPC#7):

Concur. As the commenter noted, Expected Annual Damages (EAD) are an effective metric for calculating the reduction of both probability and consequences of flooding and therefore a single objective can be used to articulate this goal. Therefore, the first two objectives have been combined to avoid redundancy. Planning objectives are used to formulate solutions by clarifying what a plan is desired to achieve which goes beyond just the evaluation of alternatives. Objectives can also be understood as a means to articulate a mission statement of the Federal and non-Federal planning partnership that further emphasizes the importance of including actions the sponsor would continue to implement. Maintaining focus on both the wise use of the floodplain and communication of residual risk are important outcomes for the GRR.

Recommendation #1: Adopt
The first and second planning objectives have been combined into one objective to reduce flood risk in the study area. Section 2.5 (Objectives) and Section 3.9 (Screening of measures) have been modified to reflect this change.

Recommendation #2: Not adopt
The two final planning objectives have not been eliminated. These objectives are needed to highlight the importance of addressing life safety and residual risk management and communication.

Panel Final BackCheck Response (FPC#7):

Concur. The Panel agrees that the last two objectives included in the report (to encourage wise use of the floodplain and to educate the public about residual risks) are important and should be emphasized. However, both are actions that can (and should) be taken to achieve an objective (e.g., reduce flood risk) and should be *considered management measures*. In the ARCF GRR, they are both included in the no action alternative and all action alternatives and as a result, their inclusion as objectives does not detract from the evaluation and comparison of alternatives. For this reason, the Panel is concurring with this Evaluator Response because, overall, including the last two objectives in the ARCF GRR, did not affect the planning process.

Final Panel Comment 8

The basis for the assumption that the project will receive total Federal and non-Federal funding for implementation at a rate of $44 million to $197 million per year over the entire 10-year implementation period has not been provided, and the construction period may be too short, which would result in an underestimate of the cost of interest during construction.

Basis for Comment

GRR Table 5-5 summarizes annual Federal and non-Federal funding for implementation of the project (e.g., design, land acquisition, construction) from 2018 through 2027: $29 million to $128 million per year in Federal funding and an additional $16 million to $91 million per year in non-Federal funding. The GRR assumes the project will receive Federal and non-Federal funding for implementation at a rate of $44 million to $197 million per year over the entire period. The Panel cannot determine whether this is a reasonable funding schedule since the GRR does not provide a rationale for the schedule. In addition, there are several concurrent Federal and non-Federal projects competing for the same funding. If funds are not available at the assumed schedule, the project will accrue additional interest costs that have not been considered in the economic analysis of the TSP.

Significance – Medium/Low

If funding is not available at the proposed schedule, additional interest costs may be incurred. However, given the high benefit-to-cost ratios, this should not affect the recommendation of the TSP or justification of the project.

Recommendations for Resolution

1. Add a description of the basis for the assumption that the project will receive $44 million to $197 million per year during the implementation of the project, including an explanation of why concurrent Sacramento District project funding requirements will not impact the availability of funds for this project.
2. Provide a revised funding schedule to evaluate the potential impact on the TSP benefit-to-cost ratio to account for additional interest costs if the project completion date is extended.

PDT Final Evaluator Response (FPC#8):

Concur. More clarity on the funding assumptions has been added to the GRR.

Recommendation #1: Adopt
Optimal funding from Federal and Non-Federal Sponsors was used as a baseline comparison between the final array of alternatives as a matter of policy. Standard practice for Corps civil works project is to reflect design and construction how it would be best to play out and assume that funding will be provided in time to support this schedule. The duration was determined based on a variety of factors including construction rates, air emissions, property acquisitions, and resource capacity to execute the design and construction of the features. The cost risk contingencies also considered the possibility of competition between flood risk projects in the same area. The description in the text will be expanded to clarify this.

In addition, Civil Works Transformation, which began in 2012, emphasizes the need to fund high-risk projects more efficiently. This funding assumption is consistent with Civil Works Transformation.

Recommendation #2: Not adopt

As stated above, standard practice is to assume optimal funding. If during construction, optimal funding does not keep pace, it will be reflected in the mandated Economic Updates which are required at least every three years. However, by policy, "interest during construction will only be calculated based on remaining construction costs and a schedule to complete that assumes adequate funding." Based on this guidance, a schedule delay will impact BCR updates less significantly than if all sund IDC was included. Additionally, with the nature of federal funding, as part of Civil Works Transformation, less projects are being funded, but they are being fully funded; the projects that are in the highest federal interest are the ones that are being fully funded. This project, because of the large population at risk and the strong economic justification, makes it a good contender to being one of these projects that are fully funded. Therefore, it is unlikely that the schedule will be significantly delayed causing a higher IDC cost.

Panel Final BackCheck Response (FPC#8):

Concur.

Final Panel Comment 9

The rationale and process for selecting the index points are not described or consistently listed in figures, making it difficult to assess whether the index points are representative of potential economic impacts.

Basis for Comment

The GRR does not discuss the relevance of the index points to the extent of flood plain inundation or land use/density. It is therefore unclear whether these index points provide a representative assessment of potential economic impacts. The GRR (and its supporting appendices) discusses the selection of index points used to calculate annual damages on the basis of hydraulic reaches defined by geotechnical conditions. The GRR (p. 3-31) states that index points "are located on the main flood sources, were chosen in order to be able to reasonably characterize the flood risk associated with each of the three main basins by accounting for the multiple sources of flooding in each basin." Appendix C, Attachment C Draft Geotechnical Report (also called Appendix F of the Geotechnical Report) provides the cross-sectional detail of the selected index points, while the Hydraulic Appendix Executive Report provides hydraulic inputs to the various index points.

The Economics Appendix states (p. 24) that 25 reaches were identified and five were selected by the project team for use in economic modeling and the associated without-project damage and with-project benefit analyses; however, no explanation is provided for why the 25 reaches were reduced to five or how the five were selected. Three additional points were added at locations where there are no levees. An additional index point ARS B was added, but only used to "estimate damages associated with emergency cost losses." The Economics Appendix references Figure 7 relative to the location of the index points used in the economics analysis; however, ARS B is not shown on the figure.

In addition, Figure 8 from the Hydraulic Appendix Executive Report also does not include all index points that were considered, and the Geotechnical Report references Plate 2 as showing the index point location; however Plate 2 was not included in the review materials.

Significance – Medium/Low

A concise explanation of the basis for index point selection will add clarity to the report and provide additional justification for the economic analysis.

Recommendations for Resolution

1. Explain the rationale for index point selection.
2. Include Index Point ARS B on Figure 7 of the Economics Appendix.
3. Confirm that all the figures showing index points in the various appendices are consistently listed.

PDT Final Evaluator Response (FPC#9):

Concur. Additional explanation has been included in the Economic Appendix that describes the rationale for choosing the representative index points used in the economic analysis.

Consistent with SMART planning principles, the PDT's intent was to balance rigor with practicality in choosing the number of index points to use in the analysis. Once the number of index points was determined for this GRR – essentially one index point to represent a major source of flooding (per bank side) plus several others to be able to check for residual damages (e.g., outflanking locations on the American River), the PDT then made a preliminary comparison of the chance of flooding and the consequences of flooding – in other words the overall flood risk associated with a levee breach at various locations – in selecting the representative index points. In order to make this comparison, the PDT used preliminary floodplains, geotechnical levee fragility curves showing probabilities of failure, and preliminary engineering performance results generated from HEC-FDA. During the course of the study, two of the index points that were originally selected (ARS B and ARS E) were replaced by alternate index points ARS A and ARS F (and their respective engineering data). The PDT believes that the index points used in the current analysis allows for a fair characterization of both the future without-project and with-project conditions.

Recommendation #1: Adopt
Additional language regarding the selection of representative index points has been included in the Economic Appendix.

Recommendation #2: Not adopt
Index point ARS B was originally selected but has been replaced with ARS A. Any reference to ARS B in the Economic Appendix was incorrect and has been replaced with a reference to ARS A.

Recommendation #3: Adopt
Cross check of appendices to ensure consistent presentation of index points will be performed.

Panel Final BackCheck Response (FPC#9):

Concur.

Final Panel Comment 10

The Geotechnical Report does not include interpretive cross-sections of the five index points chosen to represent critical surface and subsurface conditions in the selected reaches.

Basis for Comment

As summarized in Section 8.0 of Appendix C, Attachment C Draft Geotechnical Report (also called Appendix F of the Geotechnical Report), five index points were selected to represent the critical levee section throughout the project. While the sections are generally described, there are no interpretive cross-sections showing the surface and subsurface conditions, the water levels considered, proposed improvements, or failure mechanisms considered. The clarity of the geotechnical analysis would be greatly enhanced by the inclusion of interpretive cross-sections.

Significance – Medium/Low

Without cross-sections it is difficult to evaluate the reasonableness of the geotechnical analyses summarized in the appendix.

Recommendations for Resolution

1. Provide an illustrative, interpretive cross-section of each of the five index points where geotechnical analysis was conducted
2. Show topography, subsurface conditions, water levels, phreatic surfaces, and the failure modes considered.

PDT Final Evaluator Response (FPC#10):

Concur. The Geotechnical Attachment will be revised to include raw data associated with the geotechnical analysis organized into enclosures. The raw data, including the geotechnical cross sections showing stratigraphic interpretations, being provided as the response to this comment will be included in those enclosures.

Recommendation #1: Adopt
The geotechnical cross sections are being provided as recommended.

Recommendation #2: Adopt
The requested data included in raw format as part of the response to this comment, will also be crafted into formal enclosures to the geotechnical attachment.

Panel Final BackCheck Response (FPC#10):

Concur.

Final Panel Comment 11

The seismic vulnerability of the project has not been discussed in the GRR and a strategy to address earthquake-related damage to the project area has not been identified.

Basis for Comment

The GRR does not address the seismic vulnerability of the project levees. However, Appendix C, Attachment C Draft Geotechnical Report (also called Appendix F of the Geotechnical Report) indicates that the liquefaction potential is high at all of the reaches for Natomas Basin, Reach A of the American River, and Reaches C to G of the American River southern Basin. Furthermore, the Geotechnical Report (p. 21) states that post-earthquake deformation as a result of liquefaction is a "global or structural failure mode that is very likely to compromise the ability to provide flood protection at these critical locations."

While neither USACE (USACE, 2011) nor the local sponsor under California Department of Water Resources (DWR) guidance (URS, 2012) commonly undertakes levee improvements to address seismic stability, the typical practice is to evaluate the range of deformations that could be sustained during a 200-year earthquake. Once a range of deformations has been evaluated, a post-earthquake remediation plan is developed that addresses emergency preparations, mobilization, data gathering, actions, interim repairs, long-term repairs, and public notification. Costs will be associated with planning and post-earthquake response; however, the Panel cannot determine if these costs have been considered.

Significance – Medium/Low

USACE and the local sponsor will be responsible for earthquake preparedness and post-earthquake remediation; whether costs have been allocated to these activities cannot be determined.

Recommendations for Resolution

1. Describe seismic vulnerability and post-earthquake remediation strategies in the GRR.
2. Consider the cost of post-earthquake remediation in the economic analysis and allocate the cost among Federal and non-Federal interests.

PDT Final Evaluator Response (FPC#11):

Concur. As per the ULDC (DWR, 2012) and Sacramento District internal guidelines for seismic evaluation of levees (USACE, 2013), an intermittently-loaded levee is a levee that does not experience a WSE of 1 foot or higher above the elevation of the landside levee toe at least once a day for more than 36 days per year on average. The ARCF GRR Study Area has low frequencies of measurable channel flow, resulting in the Study Area levees to be considered intermittently loaded. This classification results in the determination that coincident flood and seismic events are not likely and do not need to be accounted for during the levee improvement design process (no seismic specific design measures). Therefore, seismic failure of levees does not significantly contribute to the levee performance curve when compared to seepage, stability, erosion, vegetation, utilities, encroachments, and animal activity.

The Sacramento District performed a seismic evaluation as part of the ARCF General Reevaluation Report (USACE, 2010). For the Study Area, liquefactions analyses and seismic vulnerability analyses

were performed for the most critical cross-section in each reach. Based on the seismic vulnerability analyses, the majority of reaches within the Study Area were classified as “Very Likely Compromised” with respect to post-seismic flood protection ability. As part of DWR’s ULE Project, URS also performed a seismic evaluation. The ULE study provides results of seismic vulnerability evaluations, including liquefaction potential analysis and post-seismic vulnerability analyses. Based on the ULE seismic evaluations, the levees were identified as having “low to medium seismic vulnerability”.

Therefore, for purposes of this study, it is assumed that if liquefaction of a segment of levee occurs as a result of an earthquake during the life of the project, agencies will perform the necessary inspections of the infrastructure for visible signs of damage. If there was a change in the structure’s ability to perform as intended, an emergency flood fight would be initiated by state and local agencies. If the flood fight in the area exceeded the state’s ability to respond, then PL 84-99 flood fight assistance could be requested through a governor’s letter. Following the flood event, if necessary the request for PL 84-99 rehabilitation assistance could be requested/sought to address the areas with damage. The USACE policy does not require consideration of PL 84-99 in the project economics.

Recommendation #1: Adopt
Language has been added to the GRR, Section 2.3, addressing the intermittent loading of levees in the study area, and the seismic vulnerability of the levees, and to Section 4.5 of the GRR addressing post earthquake remediation strategies.

Recommendation #2: Not adopt
The U.S. Army Corps of Engineers Policy does not require consideration of PL 84-99 in the project economics.

Panel Final BackCheck Response (FPC#11):

Concur.

Literature Cited:

USACE (2011). Guidelines for Seismic Stability Evaluation of USACE Levees. U.S. Army Corps of Engineers Sacramento District. December 2.

URS (2012). Development of a 200-year Return Period Seismic Hazard Map for the Urban Levee Evaluation Program. URS Corporation, California DWR Urban Levee Evaluation Program. February 24.

Final Panel Comment 12

It is not clear in the GRR whether a water control plan has been developed and will be adopted when construction of the Joint Federal Project auxiliary spillway at Folsom Dam is complete.

Basis for Comment

The GRR states that a new water control manual will be adopted when the Folsom Dam Joint Federal Project (JFP) is complete. This water control plan will specify an operating strategy that will govern future discharges from the dam, allowing larger discharges to be made when lake stages are at lower levels. The rate and frequency of discharges from Folsom Dam are important factors affecting the risk of flooding in the study area.

Although the water control plan is adequately defined in the Hydrology Appendix to the GRR, it is not clear in the GRR itself whether the plan defined in the Hydrology Appendix has been developed and will be adopted when the JFP is complete or whether the plan is under development. The likelihood that the operating strategy for the water control plan assumed in the GRR could change in the future is not made clear in the GRR.

Significance – Low

A description of the water control plan that is assumed to be in place for the future without- and with-project conditions will provide a better understanding of how the alternative plans were evaluated.

Recommendation for Resolution

1. Add a brief description to the GRR defining the Folsom Dam water control plan that is assumed in the GRR for the future without- and with-project conditions.

PDT Final Evaluator Response (FPC#12):

Concur. The ARCF GRR without-project condition assumed that the JFP is constructed and the update to the water control manual is complete. The ARCF GRR with-project conditions do not include any proposed changes in operation at Folsom Dam; therefore, the operations at Folsom would be the same for the with- and without-project conditions. This assumption includes a 400,000 acre-feet to 600,000 acre-feet (400/600) variable flood space operation that takes incidental storage space in upstream reservoirs into consideration when determining how much flood storage is needed at Folsom Dam during the flood season.

Recommendation #1: Adopt

The following additional detail has been added to the description of the JFP water control plan for the without project condition in Section 2.8.3 of the GRR. “In 2017, the Folsom Joint Federal Project (JFP) auxiliary spillway at Folsom Dam (Figure 2-10) will be completed and a new water control manual will be adopted (Folsom Dam Modifications). This includes a 400,000 acre-feet to 600,000 acre-feet (400/600) variable flood space operation that takes incidental storage space in upstream reservoirs into consideration when determining flood storage requirements at Folsom Dam during the flood season.

Panel Final BackCheck Response (FPC#12):
Concur.

Final Panel Comment 13

Several of the proposed non-structural management measures are already in place and should not be considered management measures in the GRR.

Basis for Comment

The GRR is evaluating the feasibility of modifying an existing flood risk management project that is being operated in accordance with laws, executive orders, policies, and regulations that are applicable to USACE flood risk management projects.

Executive Order 11988 (1977) directs Federal agencies to "… avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative." Accordingly, the terms of local cooperation for USACE flood risk management projects (including the existing American River Project) require non-Federal sponsors to (among other things):

- Prepare and implement a floodplain management plan designed to reduce the impact of future flood events in the project area (ER 1105-2-100; USACE, 2000).
- Not less than once each year, inform affected interests of the extent of protection afforded by the project.

The terms of local cooperation for USACE flood risk management projects require that the non-Federal sponsors implement several measures that are included as non-structural management measures considered for the GRR. Non-structural management measures identified in the GRR that are currently requirements of local cooperation are floodplain management, providing floodplain information to regulatory agencies, local building codes, annual publication of residual risks, and a Federal flood insurance program (USACE, Project Partnership Agreements website). Since these measures should be in place now and in the future, it is not appropriate to include them as management measures for consideration in the GRR. Including these non-structural management measures in the GRR implies that they are not currently in place or will not be in place in the future. Since these measures should be in place now and in the future, they should be part of the FWOP condition.

Significance – Low

Elimination of non-structural management measures that are currently in place as requirements of local cooperation for the existing flood risk management project will reduce the potential for confusion and improve the overall understanding of the proposed versus existing non-structural management measures for the project.

Recommendation for Resolution

1. Review the proposed set of non-structural management measures and eliminate those that are currently in place.

PDT Final Evaluator Response (FPC#13):

Concur. The non-structural management measures that are currently in place as requirements of local

cooperation for the existing flood risk management project have been removed to reduce the potential for confusion and improve the overall understanding of the proposed versus existing non-structural management measures.

Recommendation #1: Adopt
Tables 3-3 and 3-5 and Section 3.8 of the GRR have been modified to remove the non-structural measures that are currently in place (telemeter stream flow gages and modifications to the flood warning system) as well as the measures that are considered items of local cooperation. The following description has been added to explain how these measures are treated: "Other measures, including floodplain management, providing information to regulatory agencies, local building codes, annual publication of residual risk and participation in Federal flood insurance programs are all existing measures that are currently in place but these will also be items of local cooperation to be agreed to by the sponsor as part of implementation of the Recommended Plan".

Panel Final BackCheck Response (FPC#13):

Concur.

Literature Cited:

E.O. 11988 (1977). Executive Order 11988 – Flood Plain Management. 42 FR 26951, 3 CFR, 1977 Comp. Issued May 24, 1977. Available online at: https://www.fema.gov/executive-order-11988-floodplain-management.

USACE (2000). Planning – Planning Guidance Notebook. Engineer Regulation (ER) 1105-2-100. U.S. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. April 22.

USACE. Project Partnership Agreements. U.S. Army Corps of Engineers Headquarters website. Online at: http://www.usace.army.mil/Missions/CivilWorks/ProjectPartnershipAgreements.aspx

Final Panel Comment 14

The critical volume durations in the Hydrology Executive Report appear to be inconsistent, which makes the discussion of the hydrology difficult to understand.

Basis for Comment

Section A-3 (p. B2-2) of the Hydrology Executive Report (Appendix C, Attachment A of the GRR) first refers to Figure A-1 when discussing inflow hydrographs into the Folsom Reservoir. Figure A-1 appears to show flood waves composed of 4-day volumes. This section then notes that "The 3-day duration is considered the most critical within the American River Basin." The connection between the text and the figure is unclear.

Significance – Low

The discrepancy between Figure A-1 and the text of Section A-3 is confusing; if the analysis is based on the incorrect critical duration, the results of the hydrologic analyses may be different than documented.

Recommendations for Resolution

1. Verify the critical volume durations in the text vs. Figure A-1 and modify text or graph, as necessary.
2. If text and graph are correct, add text to Section A-3 to clarify the relationship between the stated 3-day critical duration and Figure A-1.

PDT Final Evaluator Response (FPC#14):

Concur. The description below will be added to clarify critical volume duration.

Section A-3 (which describes the critical duration volume as the 3-day duration) and the hydrographs shown in Figure A-1 are correct. There is no discrepancy. Each wave of inflow is composed of 4 to 5 days of runoff, but this does not negate the fact that critical duration is 3-days. Longer duration hydrographs (more than 3-days) are utilized in the modeling because a) atmospheric rivers tend to produce 3 - 5 day precipitation waves in this region b) after a levee break, the large, flat floodplain areas in the Sacramento area may take more than 3 days to fill c) More than 3 days must be simulated to account for timing between the larger Sacramento River and smaller American River.

Critical duration is the most challenging volume to the safe operation of the project to protect downstream. The maximum storage (filling of the reservoir) and maximum downstream discharge occurs during the maximum 3-day unregulated inflow, rather than after that period. While critical duration is described as the 3-day, the Folsom Dam inflow hydrographs are actually balanced to multiple durations (including the critical 3-day volume). The hydrograph is balanced to all durations shown in Table A-1 (page B2-4) which includes the peak, 1-, 3-, 7-, 15-, and 30-day durations.

Recommendation #1: Adopt
The critical duration has been verified, and was determined to be correct in the appendix. The text given

above will be added to clarify the ambiguity regarding the critical volume duration in Figure A-1.

Recommendation #2: Adopt
The text above will be added to clarify critical volume duration.

Panel Final BackCheck Response (FPC#14):

Concur. The USACE response clarified that the hypothetical inflow hydrographs were not the basis for the 3-day critical volume, but serve to cover the critical 3-day duration of the inflow for the analysis. It is therefore reasonable for these hydrographs to be longer than three days. The balanced hydrograph (runoff) approach also seems reasonable given similar approaches used with rainfall patterns for smaller watersheds across the country. Based on the explanation above, USACE has adequately addressed the FPC.

Final Panel Comment 15

The reason for updating the flow record with additional data for Arcade Creek but not Dry Creek is unclear.

Basis for Comment

Sections 5.2 (p. B3-11) and 6.2 (p. B3-14) of the Hydrology Executive Report (Appendix C, Attachment A of the GRR) both state that updating the flow record with additional data did not seem to make much difference in the frequency curves. However, while the data for Dry Creek were not updated (Section 5.2), the data for Arcade Creek were updated with Peer Review statistics (Section 6.2). The Panel did not find any explanation for these decisions.

Significance – Low

The two different responses to updating the flow record without a rationale for the decisions is confusing and/or may suggest bias in the frequency curves.

Recommendation for Resolution

1. Provide additional text in Section 6.2 or both sections (Sections 5.2 and 6.2), as needed, to clarify the decision to update one set of data and not the other.

PDT Final Evaluator Response (FPC#15):

Concur. We agree that there is ambiguity in the way that the hydrologic periods of record were presented for the two creeks in question. Our review however confirms that both creeks (Dry and Arcade) rely on the statistics for the Peer Review Findings (Adjusted Gage Measurement) which was a study conducted in 1996. These statistics are shown in Table 3, column 2. The statistics are based on the hydrologic data set from 1962 to 1995, rather than updated statistics based on data from 1950 - 2009. The reasoning to use the 1996 analysis are as follows: a) the curve did not change significantly; and b) multiple agencies had worked together to analyze the data and results for the Peer Review Study which gave it importance.

Recommendation #1: Adopt
Text has been added to sections 5.2 and 6.2 to clarify that both creeks use the same hydrologic period of record and the reasons why the updated information was not used.

Panel Final BackCheck Response (FPC#15):

Concur. The PDT response and reasons used to support the response clarified that neither gage was updated to add data to the period of record, and that adding data to the period of record at either gage did not change the statistical mean at that particular gage. Based on this information, USACE has adequately addressed the FPC.

Final Panel Comment 16

The use of the 1-year event stage data has not been described in sufficient detail to understand how it was derived.

Basis for Comment

Section 6.2 of the Hydraulic Appendix Executive Report (Appendix C, Attachment B of the GRR) states (p. 24) that "1-year and 2-year event stage data was derived via a different process using gage data." A "1-year event" is a statistical impossibility, indicating that it has a 100% chance of being equaled or exceeded in any given year.

The Panel also noted that Section 5 of the Memorandum for the Hydrologic Engineering Center's Flood Damage Reduction Analysis (HEC-FDA) Inputs (USACE, 2013) references use of the 99% event. It may be that this is what is meant by a "1-year event." Plates 2 through 9 of the same memorandum indicate that "1yr = .999" (or 99.9% ACE)

Significance – Low

The reference to a "1-year event" is confusing and affects the understanding of how stage data were derived.

Recommendation for Resolution

1. Add a brief description of the meaning of "1-year event" for clarification, since a 1-year event cannot be statistically quantified.

PDT Final Evaluator Response (FPC#16):

Concur. The reviewer is correct that a 1-yr stage is a statistical impossibility and correctly noted that is meant to be a frequent event that approaches a 1-yr stage. The language will be updated to be consistent with the FDA Inputs Technical Memorandum, using Annual Chance Exceedance and a value that approaches a 1-yr event (now to be called a 99% (1/1.01) ACE). The frequent stages of the 1-yr and 2-yr are needed to produce for a full range of the stage frequency curve for HEC-FDA.

Recommendation #1: Adopt
The language will be updated to be consistent with the FDA Inputs Technical Memorandum, using Annual Chance Exceedance and a value that approaches a 1-yr event (now to be called a 99% (1/1.01) ACE).

Panel Final BackCheck Response (FPC#16):

Concur.

Literature Cited:

USACE (2013). Memorandum for File: American River Common Features GRR Feasibility Study. HEC-FDA Inputs. U.S. Army Corps of Engineers, Hydraulic Analysis Section, Sacramento District, Sacramento, CA. 15 May.

Final Panel Comment 17

The level of significance of impacts on biological resources after mitigation is not presented in sufficient detail.

Basis for Comment

In the Draft EIS/EIR, Table ES-3 summarizes environmental effects, mitigation, and levels of significance for each alternative. Under the "Vegetation and Wildlife" category (p. ES-11), the effects are listed as "significant" (with mitigation incorporated). At the mid-review of the IEPR, the Panel asked USACE if that means the conclusion is "significant and unavoidable," even with mitigation incorporated; and, if so, whether that was because permanent loss of riparian vegetation is assumed despite compensatory mitigation. In response, USACE clarified that long-term effects on vegetation would be less than significant with the compensatory mitigation; however, the short-term effect would be significant and unavoidable due to the temporal loss of habitat (because of the amount of time it takes for the new habitat to reach the same quality). The Panel agrees with USACE that addressing both short- and long-term effects of project implementation on vegetation is a good approach for this project. However, if separate significance findings are concluded and presented for short- and long-term effects, then those should be clarified and stated in the appropriate sections of the EIS/EIR (i.e., Executive Summary and Section 3.6) for clarity. Clarifying this would make the link between the specific impact and proposed mitigation more transparent.

For biological resources impacts discussed in Sections 3.6 (Vegetation and Wildlife), 3.7 (Fisheries), and 3.8 (Special-Status Species), the level of significance after mitigation is not clearly presented. These sections lack a conclusion about which potentially significant effects have been reduced to a less-than-significant level and why, and which have not.

Significance – Low

The biological rationale and evidence to support the conclusions of the analysis of impacts on biological resources are not consistent or clearly presented, which limits the completeness and technical quality of the Draft EIS/EIR. The nexus between the context, intensity, and significance (per NEPA and CEQA requirements) is important for supporting the analysis, conclusions, and whether proposed mitigation is adequate.

Recommendations for Resolution

1. For the biological resources impact discussions presented in Sections 3.6, 3.7, and 3.8 of the Draft EIS/EIR, add a conclusion statement about which potentially significant effects have been reduced to a less-than-significant level and why, and which (if any) have not. (For consistency, this revision could be made to all of the resource sections.)
2. Review and, if needed, revise Table ES-3 to make it consistent with the analysis conclusions for biological resources.

PDT Final Evaluator Response (FPC#17):

Concur. Will state in Section 3.6 and in the Executive Summary table that short term impacts to vegetation are significant but that in the long term those effects will be less that significant with mitigation.

Will add or clarify conclusion statements in Sections 3.6, 3.7, and 3.8 to ensure they state the level of significance and whether or not it's reduced with mitigation

Recommendation #1: Adopt
Will add conclusion statements to the resource sections clarifying whether effects are potentially significant and whether they are reduced to less-than-significant with mitigation or not.

Recommendation #2: Adopt
Will update table ES-3 to make it consistent with the conclusions in the analysis sections.

Panel Final BackCheck Response (FPC#17):

Concur.

6. For further information, please contact me at (415) 503-6852 or Ms. Anastasiya Hernandez, PCX IEPR Lead for this effort, at (410) 962-2558.

Encl

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American River Common Features, California, Flood Risk Management Project
General Reevaluation Report and Impact Statement\ Environmental Impact Report

DRAFT

U.S. Army Corps of Engineers Response to
Independent External Peer Review
September 2015

Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of WRDA 2007, EC 1165-2-209, and the Office of Management and Budget's Final Information Quality Bulletin for Peer Review (2004).

The goal of the U.S. Army Corps of Engineers (USACE) Civil Works program is to always provide scientifically sound, sustainable water resources solutions for the nation. The USACE review processes are essential to ensuring project safety and quality of the products USACE provides to the American people. Battelle Memorial Institute (Battelle), a non-profit science and technology organization with experience in establishing and administering peer review panels for the USACE, was engaged to conduct the IEPR of the American River Common Features, California Flood Risk Management Project General Reevaluation Report and Environmental Impact Statement and Environmental Impact Report (EIS\EIR).

The Battelle IEPR panel reviewed the Draft General Reevaluation Report (GRR) and Draft EIS/EIR, as well as supporting documentation. The Final IEPR Battelle Report was issued in June 2015.

Overall, 17 comments were identified and documented; one was identified as having high significance, three were identified as having medium significance, seven had medium/low significance, and six were identified as having low significance. The following discussions present the Final Response to the 17 comments.

Based on the technical content of the study documents and the overall scope of the project, Battelle identified candidates for the panel in the field of Civil Works Planning, National Environmental Policy Act (NEPA) and Biology, Hydrology and Hydraulics Engineering, and Geotechnical Engineering. Four panel members were selected for the IEPR.

1. IEPR Comment – *High Significance*. It is not clear why the hydraulic profile for the future without-project condition is significantly higher than the profile for Alternative 1. If the baseline condition is not correct, there is a high risk that the flood damage estimates will be incorrect. If, on the other hand, Alternative 1 is incorrect, then there is a risk that the National Economic Development (NED) plan has not been identified.

The comment includes one recommendation for resolution which was adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended verifying the profiles and adjusting the analysis as necessary. In response, plates 31 to 56 in the Hydraulic Appendix Executive Report were verified for baseline conditions and Alternative 1 profiles. The water surface profiles for Alternative 1 and the future without-project condition are identical. The differences observed in the plates were from a superseded and now out of date strategy to measure hydraulic effects of a combination of projects along the American River including the Joint Federal Project Auxiliary Spillway.

2. IEPR Comment – *Medium Significance*. Details as to why non-Federal agencies would not continue to undertake incremental improvements to the levee system in the future without-project condition are not included in the GRR.

The comment includes one recommendation for resolution which was adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended explaining in the GRR and Economics Appendix why it is anticipated that local interests will not make improvements to the levee system in the FWOP condition. Additional language has been added to Section 2.8 (Future Without-Project Condition) of the GRR and the Economics Appendix to explain that the non-Federal sponsor will have future funding limitations that will hamper their ability to construct the project without the involvement of the Federal Government. It will also note that the sponsor will be seeking both permission to alter the Federal Flood Management Project (Section 408) and Credit Consideration (Section 221) for levee improvement work they intend on constructing prior to implementation of the ARCF GRR recommended project. These actions will not be considered part of the without project condition however, in order that the sponsor may receive credit consideration in the future.

3. IEPR Comment – *Medium Significance*. Baseline conditions for invasive plants in the project area, and an effects analysis for invasive plant spread as a result of project construction, have not been presented.

The comment includes two recommendations for resolution which were both adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended discussing existing conditions for invasive plants/noxious weeds in the project area in Section 3.6 (Vegetation and Wildlife) of the Draft EIS/EIR. If recent field or other site-specific data to characterize invasive plant conditions in the study area are not available, then a summary of the expected or likely conditions there based on land cover types, levels of disturbance, and known invasive plant occurrences in nearby areas would be adequate.

USACE Response (#2): Adopted

Action Taken: The IEPR panel recommended discussing construction-related impacts in the effects analysis and to consider whether mitigation to prevent invasive plant spread during construction is needed. This discussion was added.

4. IEPR Comment – *Medium Significance*. Some biological resources in the study area potentially affected by project implementation have not been analyzed or presented in sufficient detail to describe the existing conditions and support the Draft EIS/EIR analysis.

The comment includes ten recommendations for resolution which were all adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended adding figures that depict biological resources within the study area, including vegetation/habitat types in relation to proposed project features.

USACE Response (#2): Adopted

Action Taken: The IEPR panel recommended adding a table in Section 3.6 that quantifies (in acres) and compares the amount of each land cover type, including waters of the U.S., assumed to be affected under each alternative.

USACE Response (#3): Adopted

Action Taken: The IEPR panel recommended clarifying in Section 3.6 whether the vegetation variance to protect riparian vegetation on the waterside of improved levees was factored into the quantification of riparian vegetation impacts (locations, acreages) and describing whether the

estimate of riparian/SRA habitat loss presented in the analysis already accounts for reduced impacts under the vegetation variance.

USACE Response (#4): Adopted

Action Taken: The IEPR panel recommended defining in Section 3.8 which categories of special-species were evaluated (e.g., species listed as threatened or endangered under the Endangered Species Act or California Endangered Species Act, designated by California Department of Fish and Wildlife as species of special concern, Fully Protected under the California Fish and Game Code, etc.).

USACE Response (#5): Adopted

Action Taken: The IEPR panel recommended adding an analysis of special-status plant species to Section 3.8, including information on existing conditions, a table that summarizes special-status plant species with potential to occur in the study area, an analysis of potential effects, and proposed mitigation.

USACE Response (#6): Adopted

Action Taken: The IEPR panel recommended expanding the analysis in Section 3.8 to include all special-status animal species with potential to occur in the study area. In Table 17, include all special-status animals initially considered or with potential to occur. For any of those species that could occur and be affected, analyze potential effects of project implementation and, if needed, describe the proposed mitigation for any significant effects. For a more complete list and discussion of species in the area, refer to USACE's West Sacramento Project EIS/EIR.

USACE Response (#7): Adopted

Action Taken: The IEPR panel recommended clarifying in the Draft Biological Assessment (BA) and the Draft EIS/EIR how impacts on elderberry shrubs and the Valley Elderberry Longhorn Beetle (VELB, special status species) were quantified from the survey data; resolve the inconsistency in survey information presented in pages 65 and 71 of the Draft BA.

USACE Response (#8): Adopted

Action Taken: The IEPR panel recommended adding, in Section 3.6, a discussion of tree removal as it relates to compliance or conflict with the American River Parkway Plan, the Sacramento County Tree Preservation Ordinance, or the City of Sacramento Protection of Trees Ordinance. Describe whether tree removal would conflict with these plans and ordinances, and how the proposed mitigation would achieve compliance with these plans and ordinances.

USACE Response (#9): Adopted

Action Taken: The IEPR panel recommended, in Section 3.6, adding a discussion of project-related impacts on Federally protected wetlands and other waters of the United States, and how

those effects would be mitigated (e.g., completion of a wetland delineation and appropriate compensation, as needed). Also discuss the effects on stream habitats protected under Section 1600 of the California Fish and Game Code (Streambed Alteration Agreements) and mitigation for those effects.

USACE Response (#10): Adopted

Action Taken: The IEPR panel recommended, in Section 4.2.4, expanding the discussion of cumulative effects to include all special-status species addressed in Section 3.8 (e.g., VELB, Swainson's hawk, etc.).

5. IEPR Comment – *Medium/Low Significance*. The justification to use a content-to-structure value ratio of 50% to calculate the value of contents of residential structures has not been explained and the reasonableness of this ratio is unknown.

The comment includes one recommendation for resolution which was adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended providing an explanation in the Economics Appendix of why use of a 50% content-to-structure value ratio is appropriate to calculate damageable property for this study.

6. IEPR Comment – *Medium/Low Significance*. The magnitude of impacts and level of significance for the effects of sedimentation and turbidity on fisheries resources are not easily determined.

The comment includes two recommendations for resolution which were both adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended expanding the discussion of anticipated project effects on fisheries resources. The discussion should describe impact mechanisms and the types and magnitude of biological effects. Any applicable modeling projections for project-generated in-stream effects (e.g., sediment and turbidity) and/or modeling of effects on fish habitat that may have been conducted for the project would be appropriate to reference in the fisheries analysis.

USACE Response (#2): Adopted

Action Taken: The IEPR panel recommended discussing the assumptions made about the amount of project-related increased sedimentation and turbidity (relative to baseline conditions) that would result from project implementation, and the amount that would be considered

substantial and therefore significant. If any amount of increase is considered significant, then clarify that point.

7. IEPR Comment – *Medium/Low Significance*. It is unclear why several of the planning objectives are required; some are redundant or not appropriate to fully evaluate alternatives.

The comment includes two recommendations for resolution, one of which was adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended combining the first and second planning objectives into one: reduce the Expected Annual Damages in the study area. This captures both the frequency of flooding and the consequences of flooding in one metric.

USACE Response (#2): Not Adopted

Action Taken: The IEPR panel recommended eliminating the final two planning objectives (to encourage wise use of the floodplain and to educate the public about residual risk) and adding them to the future without-project condition. The two final planning objectives have not been eliminated, as these objectives are needed to highlight the importance of addressing life safety and residual risk management and communication.

8. IEPR Comment – *Medium/Low Significance*. The basis for the assumption that the project will receive total Federal and non-Federal funding for implementation at a rate of $44 million to $197 million per year over the entire 10-year implementation period has not been provided, and the construction period may be too short, which would result in an underestimate of the cost of interest during construction.

The comment includes two recommendations for resolution, one of which was adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended adding a description of the basis for the assumption that the project will receive $44 million to $197 million per year during the implementation of the project, including an explanation of why concurrent Sacramento District project funding requirements will not impact the availability of funds for this project.

USACE Response (#2): Not Adopted

Action Taken: The IEPR panel recommended providing a revised funding schedule to evaluate the potential impact on the Tentatively Selected Plan benefit-to-cost ratio to account for additional interest costs if the project completion date is extended. Standard practice is to assume optimal funding. If during construction, optimal funding does not keep pace, it will be

reflected in the mandated Economic Updates which are required at least every three years. However, by policy, "interest during construction will only be calculated based on remaining construction costs and a schedule to complete that assumes adequate funding." Based on this guidance, a schedule delay will impact BCR updates less significantly than if all sund IDC was included. Additionally, with the nature of federal funding, as part of Civil Works Transformation, less projects are being funded, but they are being fully funded; the projects that are in the highest federal interest are the ones that are being fully funded. This project, because of the large population at risk and the strong economic justification, makes it a good contender to being one of these projects that are fully funded. Therefore, it is unlikely that the schedule will be significantly delayed causing a higher IDC cost.

9. IEPR Comment – *Medium/Low Significance*. The rationale and process for selecting the index points are not described or consistently listed in figures, making it difficult to assess whether the index points are representative of potential economic impacts.

The comment includes three recommendations for resolution, two of which were adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended explaining the rationale for index point selection.

USACE Response (#2): Not Adopted

Action Taken: The IEPR panel recommended including Index Point ARS B on Figure 7 of the Economics Appendix; however, index point ARS B was originally selected but has been replaced with ARS A. Any reference to ARS B in the Economic Appendix was incorrect and has been replaced with a reference to ARS A.

USACE Response (#3): Adopted

Action Taken: The IEPR panel recommended confirming that all the figures showing index points in the various appendices are consistently listed.

10. IEPR Comment – *Medium/Low Significance*. The Geotechnical Report does not include interpretive cross-sections of the five index points chosen to represent critical surface and subsurface conditions in the selected reaches.

The comment includes two recommendations for resolution, both which were adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended providing an illustrative, interpretive cross-section of each of the five index points where geotechnical analysis was conducted.

USACE Response (#2): Adopted

Action Taken: The IEPR panel recommended showing topography, subsurface conditions, water levels, phreatic surfaces, and the failure modes considered.

11. IEPR Comment – *Medium/Low Significance*. The seismic vulnerability of the project has not been discussed in the GRR and a strategy to address earthquake-related damage to the project area has not been identified.

The comment includes two recommendations for resolution, one of which was adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended describing seismic vulnerability and post-earthquake remediation strategies in the GRR.

USACE Response (#2): Not Adopted

Action Taken: The IEPR panel recommended considering the cost of post-earthquake remediation in the economic analysis and allocating the cost among Federal and non-Federal interests; however, the U.S. Army Corps of Engineers Policy does not require consideration of PL 84-99 in the project economics.

12. IEPR Comment – *Low Significance*. It is not clear in the GRR whether a water control plan has been developed and will be adopted when construction of the Joint Federal Project auxiliary spillway at Folsom Dam is complete.

The comment includes one recommendation for resolution, which was adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended adding a brief description to the GRR defining the Folsom Dam water control plan that is assumed in the GRR for the future without- and with-project conditions.

13. IEPR Comment – *Low Significance*. Several of the proposed non-structural management measures are already in place and should not be considered management measures in the GRR.

The comment includes one recommendation for resolution, which was adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended reviewing the proposed set of non-structural management measures and eliminating those that are currently in place.

14. IEPR Comment – *Low Significance*. The critical volume durations in the Hydrology Executive Report appear to be inconsistent, which makes the discussion of the hydrology difficult to understand.

The comment includes two recommendations for resolution, both of which were adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended verifying the critical volume durations in the text vs. Figure A-1 and modifying text or graph, as necessary.

USACE Response (#2): Adopted

Action Taken: The IEPR panel recommended adding text to Section A-3 to clarify the relationship between the stated 3-day critical duration and Figure A-1.

15. IEPR Comment – *Low Significance*. The reason for updating the flow record with additional data for Arcade Creek but not Dry Creek is unclear.

The comment includes one recommendation for resolution, which was adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended providing additional text in Section 6.2 or both sections (Sections 5.2 and 6.2), as needed, to clarify the decision to update one set of data and not the other.

16. IEPR Comment – *Low Significance*. The use of the 1-year event stage data has not been described in sufficient detail to understand how it was derived.

The comment includes one recommendation for resolution, which was adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended adding a brief description of the meaning of "1-year event" for clarification, since a 1-year event cannot be statistically quantified.

17. IEPR Comment – *Low Significance*. The level of significance of impacts on biological resources after mitigation is not presented in sufficient detail.

The comment includes two recommendations for resolution, both which were adopted as discussed below.

USACE Response (#1): Adopted

Action Taken: The IEPR panel recommended, for the biological resources impact discussions presented in Sections 3.6, 3.7, and 3.8 of the Draft EIS/EIR, adding a conclusion statement about which potentially significant effects have been reduced to a less-than-significant level and why, and which (if any) have not. For consistency, this revision could be made to all of the resource sections.

USACE Response (#2): Adopted

Action Taken: The IEPR panel recommended reviewing and, if needed, revising Table ES-3 to make it consistent with the analysis conclusions for biological resources.